United States
Department of
Agriculture

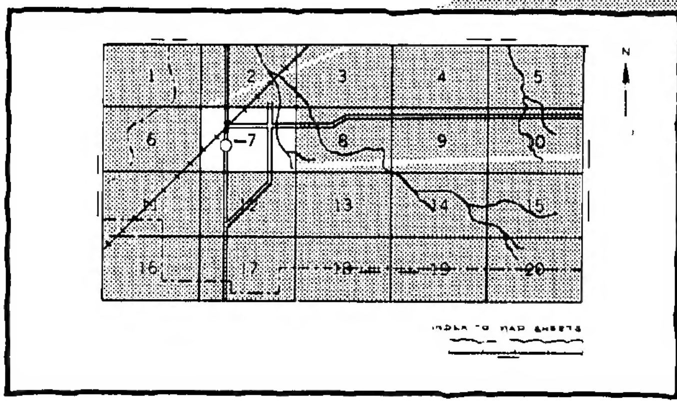
Soil
Conservation
Service

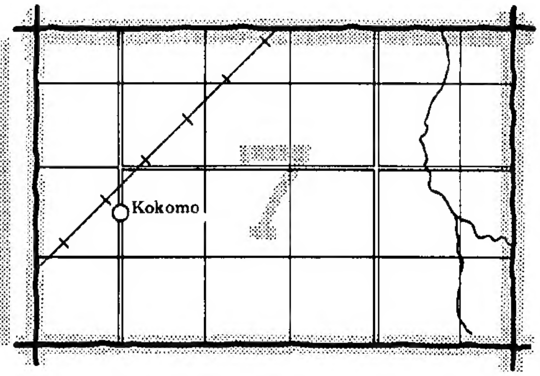
In cooperation with
Illinois Agricultural
Experiment Station

Soil Survey of Lee County Illinois

HOW TO USE

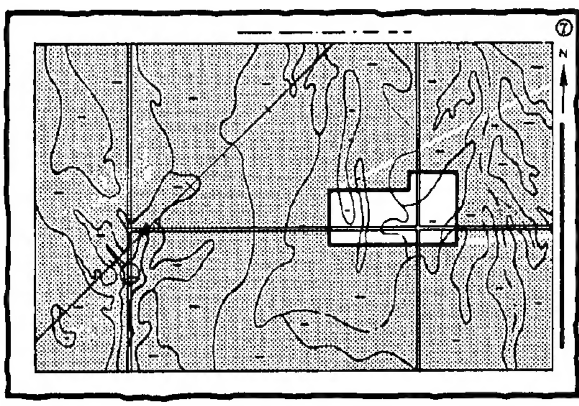
1. Locate your area of interest on the "Index to Map Sheets"

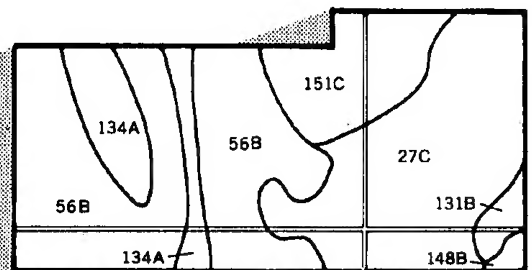




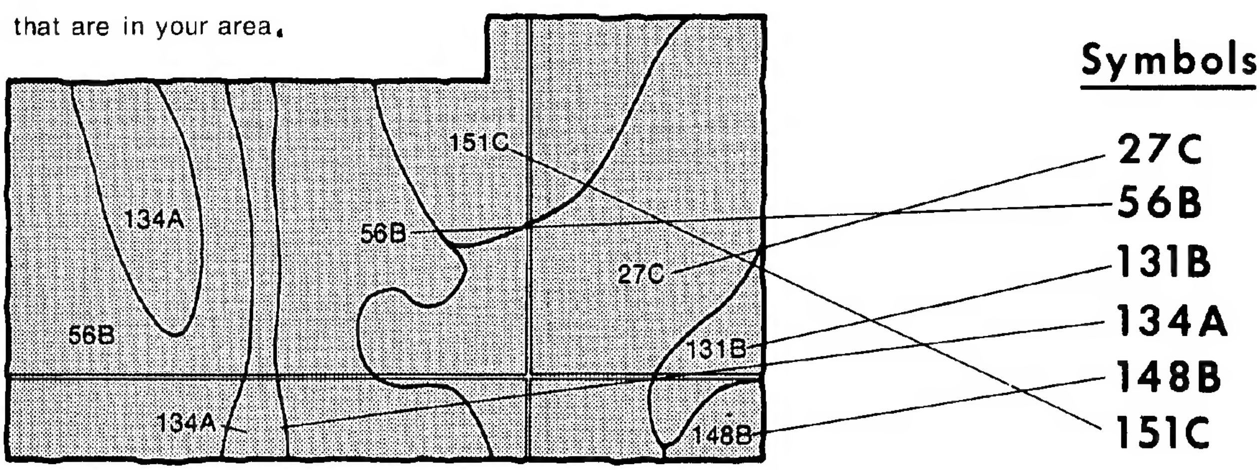
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



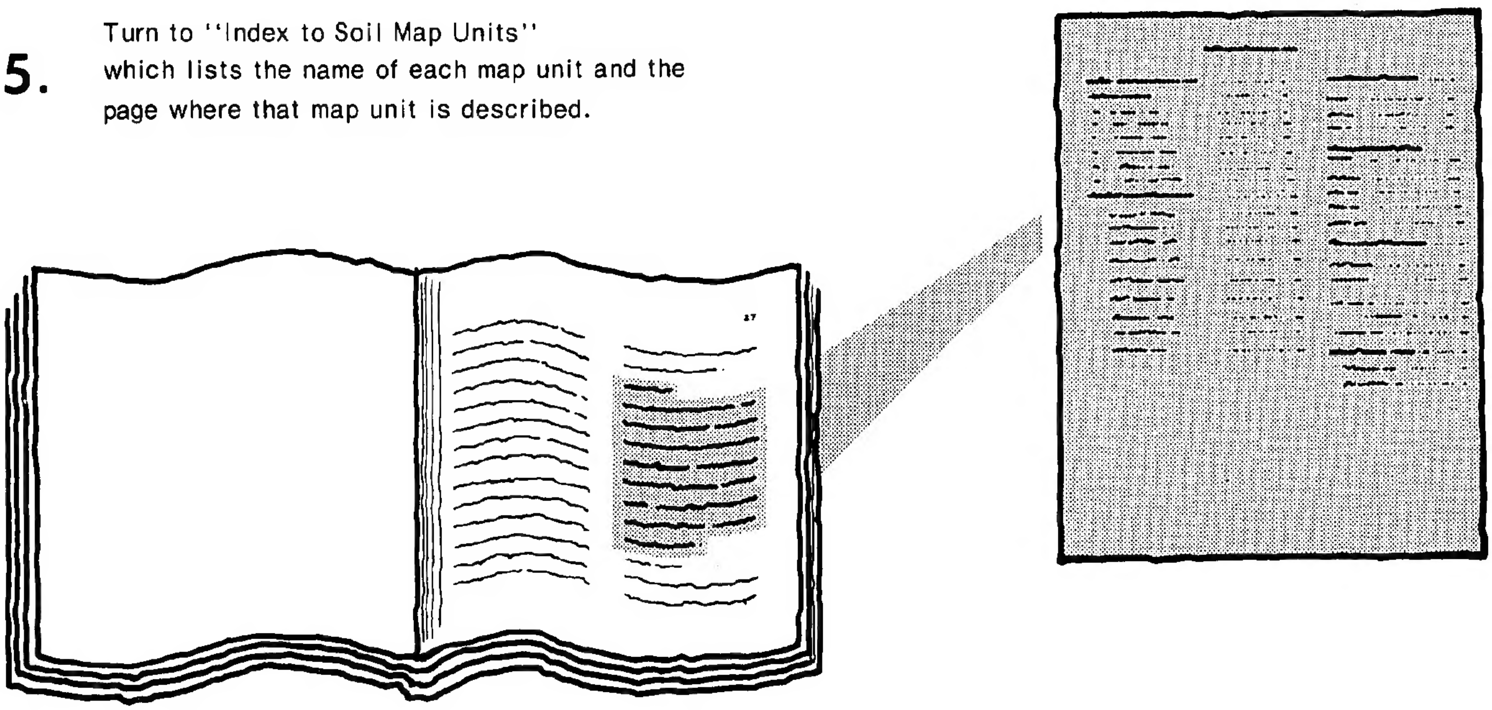


4. List the map unit symbols that are in your area.

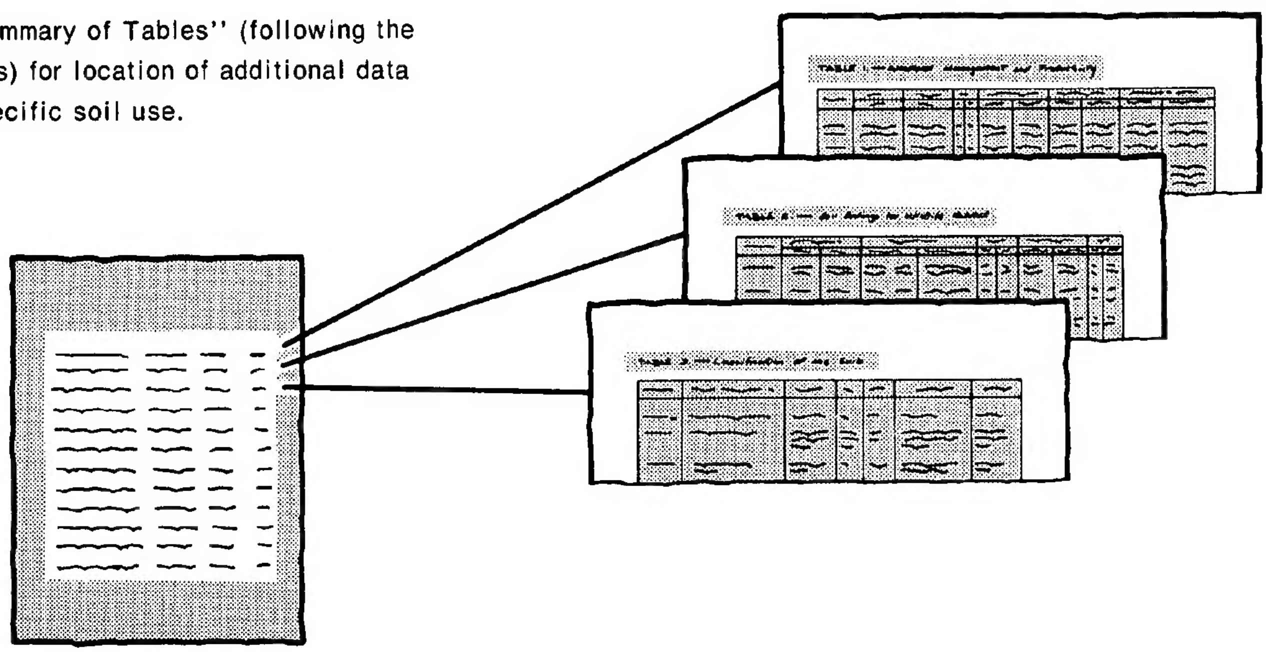


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1981. Soil names and descriptions were approved in 1981. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1981. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Lee County Soil and Water Conservation District. The cost was shared by the Lee County Board.

This soil survey is Illinois Agricultural Experiment Station Soil Report No. 118.

Cover: Contour stripcropping in an area of Ashdale silt loam, 5 to 10 percent slopes, eroded.

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Soil Series

Issued February 1985

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Summary of Tables

Foreword

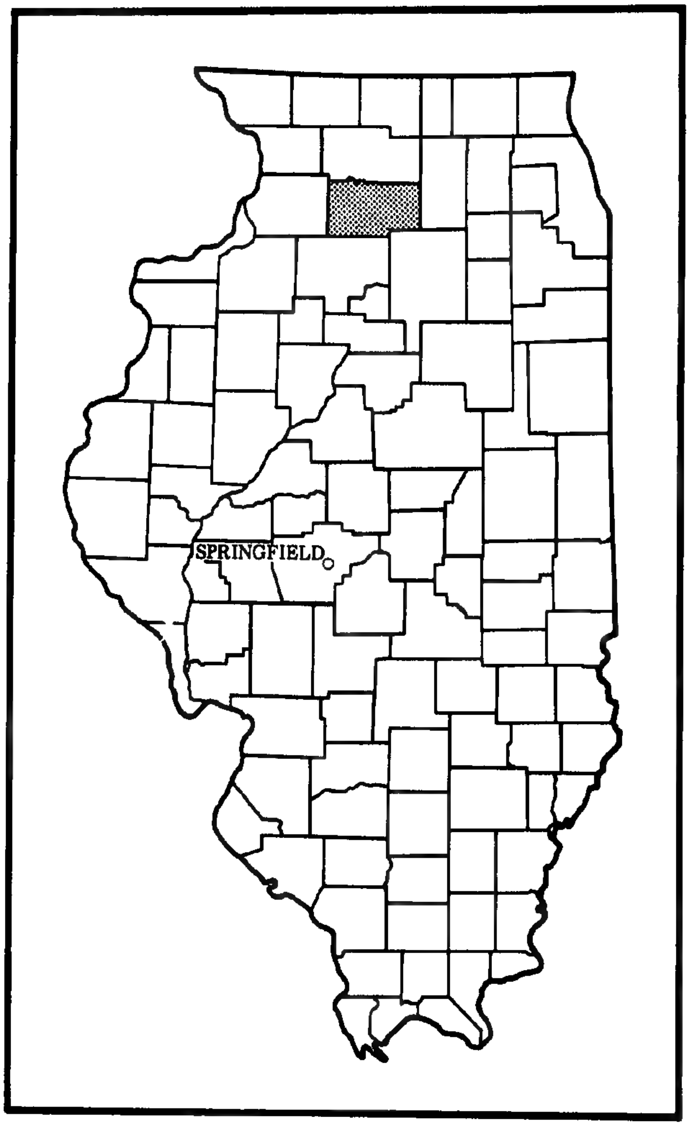
This soil survey contains information that can be used in land-planning programs in Lee County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

John J. Eckes
State Conservationist
Soil Conservation Service



Location of Lee County in Illinois.

Soil Survey of
Lee County, Illinois

By S. E. Zwicker, Soil Conservation Service

Soils surveyed by G. V. Berning, H. W. Gehant, S. K. Higgins, D. B. Rahe, R. W. Sims, and S. E. Zwicker, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
In cooperation with the Illinois Agricultural Experiment Station

LEE COUNTY is in the north-central part of the state. It has an area of about 468,480 acres, or 732 square miles. According to the U.S. Census of 1980, the population of the county is about 36,328. Dixon, in the north-central part of the county, is the county seat. It has a population of about 15,701.

This survey updates the soil survey of Lee County published by the University of Illinois in 1927 (*10*). It provides additional information and larger maps, which show the soils in greater detail.

General Nature of the County

The northwestern part of Lee County is a rolling glacial till plain that is drained by the Rock River. The central part is a relatively level landscape characterized by prominent sand ridges and dunes. It is drained by the Green River. The southeastern part is a till plain characterized by broad low ridges.

The soils in Lee County vary widely in texture, natural drainage, and other characteristics. Those in the northwestern and southeastern parts of the county are dominantly well drained or moderately well drained, gently sloping, and silty. Erosion is a severe hazard in these areas. Conservation measures help to control erosion and thus help to prevent sedimentation. If properly managed, the soils are well suited to field crops, pasture, hay, and trees. They are suited to building site development.

The soils in the central part of the county dominantly are poorly drained or somewhat poorly drained, nearly level, and loamy. Wetness is a major limitation affecting the use of these soils. Because of an extensive tile drainage system, these soils are well suited to field crops. Because of the wetness, however, they generally are poorly suited to most other uses.

The following paragraphs provide general information about Lee County. They describe the history and development of the county, the climate, farming, transportation facilities and industries, natural resources and water supply, and the native vegetation.

History and Development

The first settlement in Lee County was at Dixon in 1828. Joseph Ogee established a ferry for miners and supplies going to the mines in Galena. John Dixon purchased the ferry from Ogee in 1830. Sac, Fox, Ottawa, and Pottawatomie Indians were the main inhabitants of the area until after the Black Hawk War. The ferry was the rendezvous point of the United States troops and volunteers during the Black Hawk War in 1832 (*6*).

Lee County was established in 1839. Dixon was the county seat. By 1850, the population of the county was 5,292. The railroad was extended through Dixon in 1855. Manufacturing and farming were important enterprises. By 1880, the population was 30,186.

Much of the wetland wildlife habitat in the county was destroyed between 1887 and 1901. The major swamps were drained by tiling and ditching, which brought them into agricultural production.

In 1942, the Lee County Soil Conservation District was formed. The formation of the district allowed farmers to receive technical assistance from the Soil Conservation Service.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Lee County is cold in winter. In summer it generally is hot but has occasional cool spells. Precipitation falls as snow during frequent snowstorms in winter and chiefly as rain showers, which often are heavy, during the warmer periods, when warm, moist air moves in from the south. The amount of annual rainfall usually is adequate for corn, soybeans, and small grain.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Dixon, Illinois, in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 24 degrees F, and the average daily minimum temperature is 16 degrees. The lowest temperature on record, which occurred at Dixon on January 28, 1963, is minus 22 degrees. In summer the average temperature is 72 degrees, and the average daily maximum temperature is 84 degrees. The highest recorded temperature, which occurred on July 10, 1966, is 102 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 35 inches. Of this, 23 inches, or about 70 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19 inches. The heaviest 1-day rainfall during the period of record was 4.88 inches at Dixon on May 17, 1974. Thunderstorms occur on about 45 days each year, and most occur in summer.

The average seasonal snowfall is about 35 inches. The greatest snow depth at any one time during the period of record was 25 inches. On an average of 34 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 70 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the west-northwest. Average windspeed is highest, 11 miles per hour, in spring.

Tornadoes and severe thunderstorms strike occasionally. They are of local extent and of short duration and cause only sparse damage in narrow belts. Hailstorms sometimes occur during the warmer periods. The hail falls in scattered small areas.

Farming

Farming is the most important enterprise in the county. The total acreage in farms in 1978 was 421,412 acres (*14*). About 385,484 acres was used as cropland, including hayland and pastureland. The county had about 1,330 farms. The average farm size was 317 acres.

Most of the acreage in the county is used for corn and soybeans. Of the 385,484 acres of cropland, about 220,027 acres of corn for grain and 109,783 acres of soybeans were harvested in 1978. The small grain harvested included 1,089 acres of wheat and 6,458 acres of oats. Vegetable crops, dominantly sweet corn, were harvested from more than 8,000 acres. Other vegetables grown included peas, green beans, lima beans, asparagus, cucumbers, and melons. Hayland and pasture accounted for about 10,824 acres and 11,429 acres, respectively. About 17,874 acres was fallowed or idle land or supported cover crops or unharvested legumes.

The major livestock enterprises in the county produce beef and pork. Dairy cattle, chickens, sheep, and horses also are raised. The value of the livestock and livestock products sold in the county is less than one-third of the value of the total agricultural products sold.

Transportation Facilities and Industries

The county is crossed by several U.S. and state highways. Illinois Route 5 is part of the Illinois Tollway System. Secondary roads provide access to all areas of the county. Four rail routes provide freight service throughout the county. There are two small commercial airports, including Dixon Airport, which has paved runways.

Small industries in the county include factories that manufacture cement products and small automotive parts and food-processing plants.

Natural Resources and Water Supply

Lee County has an abundant supply of limestone, dolomite, sand, gravel, and water. Ordovician-age limestone and dolomite are mined from quarries near Dixon. The limestone has several uses. It is crushed or broken for use as road material or as agricultural limestone, railroad ballast, or portland cement. Total production in 1974 was 1,604,945 tons (*8*).

Lee County has extensive sand and gravel deposits. The most extensive ones are the alluvial and valley train deposits along the Rock River (*3*). The sand and gravel are used primarily as road material and concrete aggregate.

Most of the ground water in the northern part of Lee County is obtained from sandstone, limestone, and dolomite of Ordovician and Cambrian ages. The buried Pawpaw Valley in the eastern part of the county is an

excellent source of ground water. Shallow aquifers suitable for driven points are along the valley of the Rock River. Other shallow aquifers are in a low lying area near the western margin of the county and along the Green River (*7*).

Native Vegetation

Most of the native vegetation in the county has been destroyed. The area was dominated by prairie grasses, but some areas near the Rock River and in the Sand Hills south of Amboy were forested. Smaller groves were in scattered areas throughout the county. Rushes, cattails, bluejoint reedgrass, and prairie cordgrass grew in the swampy areas. The prairie areas of the Sand Hills region supported grasses and forbs, such as little bluestem, goatsrue, and prairie coreopsis. Common grasses in other areas were big bluestem, indiangrass, and prairie dropseed. Trees native to the area are oaks, hickories, and maples and scattered black walnut, elm, and white pine (*9*).

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this county. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map of Lee County joins with the general soil maps of Ogle, DeKalb, and La Salle Counties. Some of the names of associations in these counties do not agree with those in Lee County because the extent of the major soils in the associations in Lee County is different or because of conceptual changes that resulted from classification. The differences in the association names do not significantly affect the use of these maps for general planning.

Soil Descriptions

Nearly Level, Poorly Drained and Very Poorly Drained Soils on Low Lying Outwash Plains and Lake Plains That are Subject to Flooding

These soils are on glacial outwash plains or lake plains adjacent to the major streams or ditches. Providing flood control and maintaining the subsurface drainage system are the major management needs.

1. Selma-Gilford Association

Loamy, poorly drained and very poorly drained soils that formed in loamy material and in glacial outwash

This association consists of nearly level soils on outwash plains or lake plains adjacent to the major streams and drainageways. Shallow depressions and slightly elevated areas are throughout the association. Slopes range from 0 to 2 percent.

This association makes up about 9 percent of the county. It is about 50 percent Selma soils, 35 percent Gilford soils, and 15 percent minor soils (fig. 1).

Selma soils are nearly level and are poorly drained. Typically, the surface layer is black, friable loam about 7 inches thick. The subsurface layer is very dark gray, friable loam about 11 inches thick. The subsoil is about 35 inches thick. The upper part is dark gray, friable loam. The next part is olive gray, mottled, friable silt loam. The lower part is olive gray, very friable sandy loam. The substratum to a depth of 60 inches is olive gray, mottled, very friable, stratified sandy loam and loamy sand. It contains some gravel.

Gilford soils are nearly level and are very poorly drained. Typically, the surface layer is black, friable fine sandy loam about 10 inches thick. The subsurface layer is very dark gray, mottled, friable fine sandy loam about 13 inches thick. The subsoil is dark gray, mottled, very friable sandy loam about 17 inches thick. The substratum to a depth of 60 inches is light brownish gray, loose sand.

Minor in this association are Canisteo, Comfrey, Hoopeston, La Hogue, and Milford soils. Canisteo and Comfrey soils are in positions on the landscape similar to those of the major soils. Canisteo soils contain carbonates within 10 inches of the surface. Comfrey soils are dark to a greater depth than the major soils. The somewhat poorly drained Hoopeston and La Hogue soils are in the slightly higher areas. Milford soils contain more clay than the major soils. They are in slightly depressional areas.

Most of this association is used for cultivated crops. Many areas are irrigated. The major soils are well suited to cultivated crops. A seasonal high water table and flooding are the major limitations in cultivated areas. Measures that maintain the drainage system are needed. A moderate available water capacity and soil blowing are also limitations in areas of the Gilford soils.

This association is generally unsuited to septic tank absorption fields and dwellings and poorly suited to local roads and streets. Wetness, frost action, low strength, and flooding are the major limitations.

2. Harpster-Hartsburg-Canisteo Association

Silty, poorly drained soils that formed in loess or silty lakebed deposits

This association consists of nearly level soils on lake plains and outwash plains adjacent to the major streams and drainageways. Slopes range from 0 to 2 percent.

This association makes up about 3 percent of the county. It is about 40 percent Harpster soils, 25 percent Hartsburg soils, 25 percent Canisteo soils, and 10 percent minor soils (fig. 2).

Harpster soils are nearly level and are poorly drained. Typically, the surface layer is black, friable, mildly alkaline silty clay loam about 9 inches thick. The subsurface layer is very dark gray, friable, mildly alkaline silty clay loam about 4 inches thick. The subsoil is about 29 inches thick. It is friable, mildly alkaline, and mottled. The upper part is grayish brown, olive gray, and gray silty clay loam. The lower part is gray silt loam. The substratum to the depth of 60 inches is gray, mottled, friable, moderately alkaline silt loam.

Hartsburg soils are nearly level and are poorly drained. Typically, the surface layer is black, friable silty clay loam about 12 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 4 inches thick. The subsoil is about 32 inches thick. It is mottled, mildly alkaline, and friable. The upper part is dark gray silty clay loam. The lower part is olive gray silt loam. The substratum to a depth of 60 inches is olive gray, mottled, friable, mildly alkaline silt loam.

Canisteo soils are nearly level and are poorly drained. Typically, the surface layer is black, friable, mildly alkaline silt loam about 8 inches thick. The subsurface layer is very dark gray, friable, mildly alkaline silt loam about 5 inches thick. The subsoil is about 41 inches thick. It is friable and mildly alkaline. The upper part is gray, mottled silt loam. The lower part is mottled very dark gray and dark gray loam. The substratum to a depth of 60 inches is olive gray, loose, mildly alkaline sand.

Minor in this association are the very poorly drained Gilford soils and Selma and Will soils. The Selma and Will soils contain more sand in the subsoil and the substratum than the Harpster and Hartsburg soils. They are deeper to carbonates than the Canisteo and Harpster soils. All of the minor soils are in broad areas in positions on the landscape similar to those of the major soils.

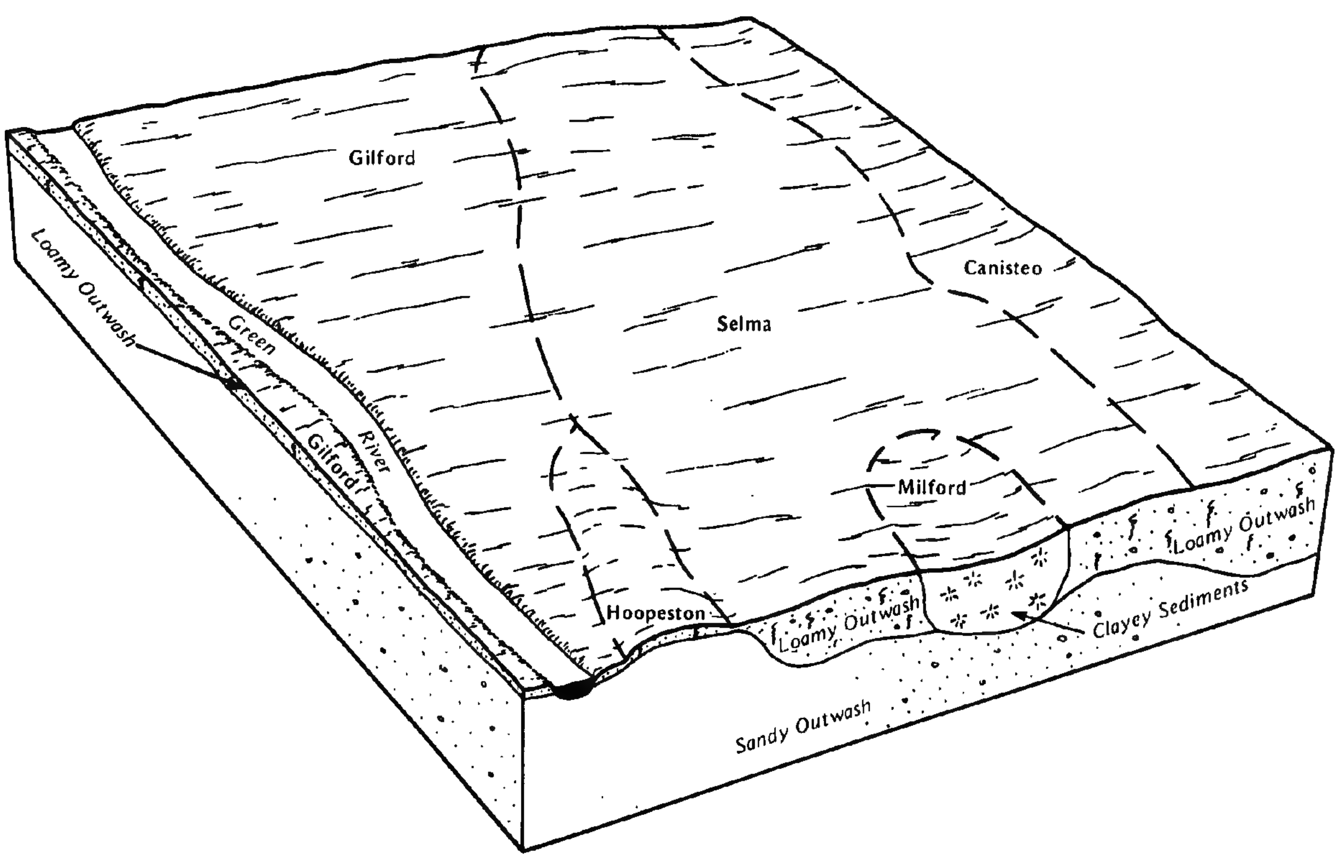


Figure 1.—Pattern of soils and underlying material in the Selma-Gilford association.

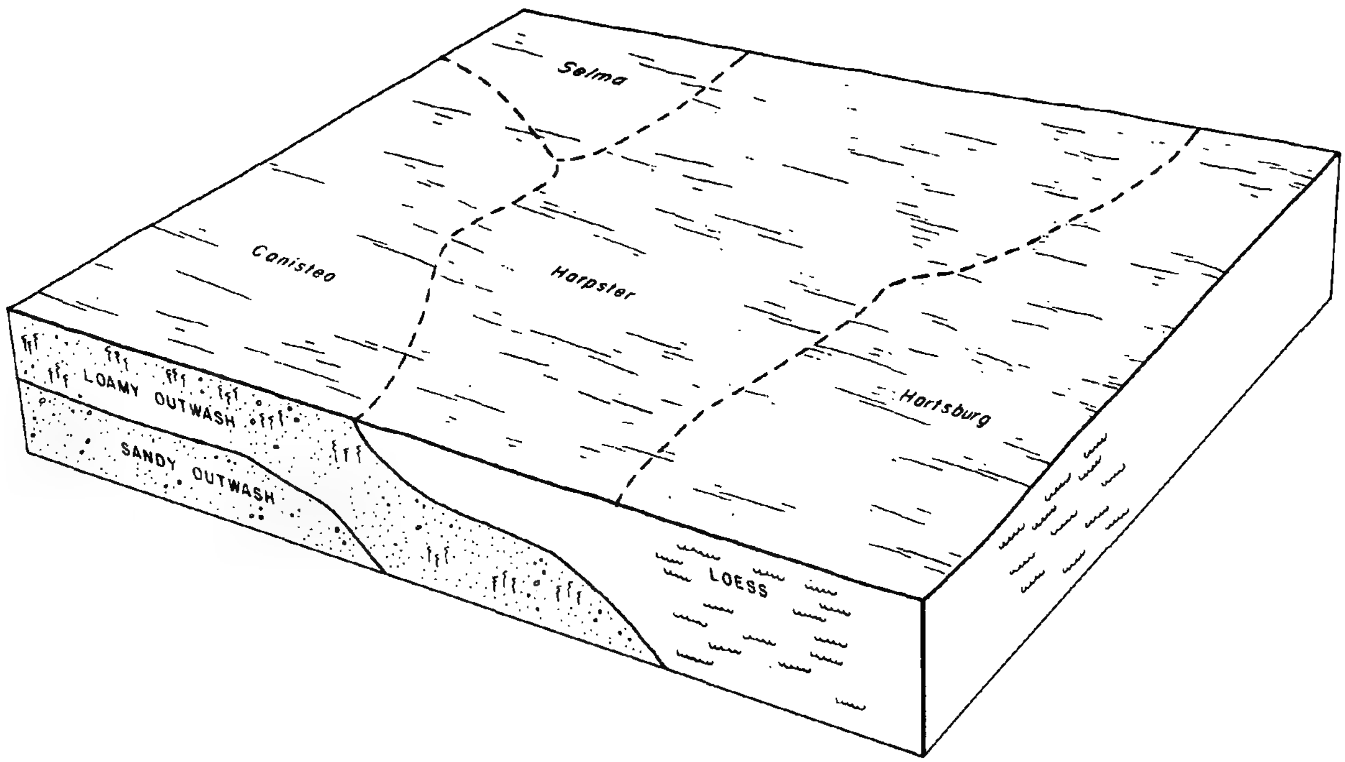


Figure 2.—Pattern of soils and underlying material in the Harpster-Hartsburg-Canisteo association.

In most areas this association is cultivated. It is well suited to cultivated crops. Flooding and a seasonal high water table are the major limitations. Measures that maintain the drainage system are needed.

This association is unsuited to dwellings and septic tank absorption fields. It is poorly suited to local roads and streets. Flooding and the seasonal high water table are the major limitations on sites for dwellings and septic tank absorption fields. The seasonal high water table and low strength are the major limitations on sites for local roads and streets.

Nearly Level, Poorly Drained and Somewhat Poorly Drained Soils on Till Plains and Outwash Plains

These soils are on outwash plains and till plains that have a layer of loess in places. Maintaining the subsurface drainage system is the major management need. In many small depressions on the till plains, surface drainage also is needed.

3. Drummer-Elburn Association

Silty, poorly drained and somewhat poorly drained soils that formed in loess and the underlying glacial outwash

This association consists mainly of nearly level soils on glacial till plains and outwash plains. Shallow depressions are throughout the association. Slopes range from 0 to 2 percent.

This association makes up about 11 percent of the county. It is about 40 percent Drummer soils, 25 percent Elburn soils, and 35 percent minor soils.

Drummer soils are nearly level and are poorly drained. Typically, the surface layer is black, friable silty clay loam about 10 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 6 inches thick. The subsoil extends to a depth of 60 inches. It is mottled and friable. The upper part is gray silty clay loam. The next part is olive gray silty clay loam. The lower part is olive gray loam and sandy clay loam.

Elburn soils are nearly level and are somewhat poorly drained. Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 40 inches thick. It is mottled. The upper part is dark grayish brown, friable silty clay loam. The next part is grayish brown, friable silty clay loam. The lower part is grayish brown, friable loam. The substratum to a depth of 60 inches is grayish brown, mottled, friable, stratified sandy loam, sandy clay loam, and clay loam.

Minor in this association are Catlin, Harpster, La Hogue, Muscatine, Plano, Selma, Warsaw, and

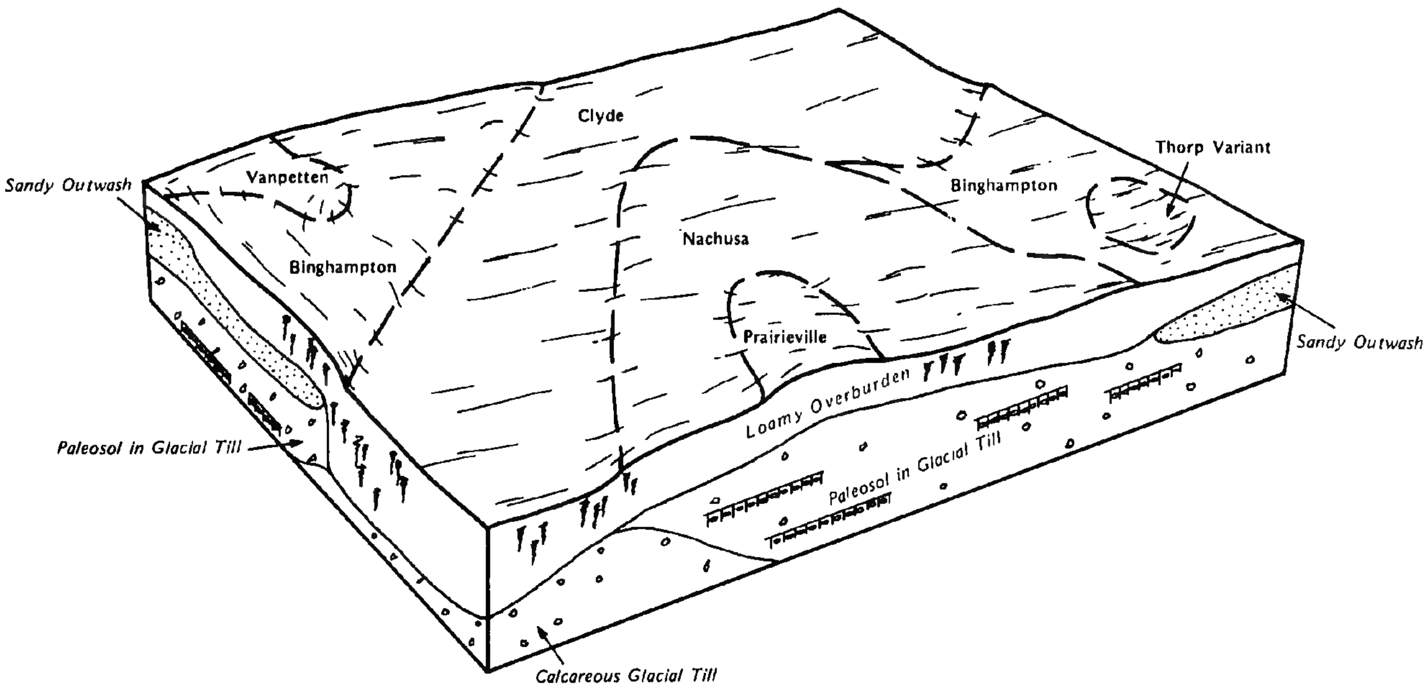


Figure 3.—Pattern of soils and underlying material in the Clyde-Binghampton-Nachusa association.

Waupecan soils. The moderately well drained Catlin, Plano, and Waupecan soils and the well drained Warsaw soils are in the slightly elevated areas. The poorly drained Harpster soils are in depressions and broad low areas. The somewhat poorly drained La Hogue and Muscatine soils are in positions on the landscape similar to those of the Elburn soils. The poorly drained Selma soils are in drainageways.

In most areas this association is cultivated. It is well suited to cultivated crops. A seasonal high water table is the major limitation. Measures that maintain the drainage system are needed.

The Drummer soils are unsuited to dwellings and septic tank absorption fields because of ponding. The Elburn soils are poorly suited or moderately suited to dwellings with basements and to septic tank absorption fields. The seasonal high water table and the shrink-swell potential are the major limitations. The association is poorly suited to local roads and streets. Low strength, frost action, and wetness are the major limitations.

4. Clyde-Binghampton-Nachusa Association

Loamy and silty, poorly drained and somewhat poorly drained soils that formed in erosional sediments or eolian material and in the underlying glacial till

This association consists mainly of nearly level soils on glacial till plains and outwash plains. Shallow, closed depressions and irregularly shaped sand ridges are throughout the association. Slopes range from 0 to 3 percent.

This association makes up about 12 percent of the county. It is about 25 percent Clyde soils, 20 percent Binghampton and similar soils, 15 percent Nachusa and similar soils, and 40 percent minor soils (fig. 3).

Clyde soils are nearly level and are poorly drained. Typically, the surface layer is black, friable clay loam about 6 inches thick. The subsurface layer is black and very dark gray, friable clay loam about 11 inches thick. The subsoil is about 28 inches thick. It is mottled. The upper part is grayish brown, friable clay loam and silty clay loam. The next part is grayish brown and yellowish brown, very friable sandy loam. The lower part is yellowish brown, firm loam. The substratum to a depth of 60 inches is yellowish brown, mottled, firm, moderately alkaline loam.

Binghampton soils are nearly level and are somewhat poorly drained. Typically, the surface layer is very dark grayish brown, friable sandy loam about 8 inches thick. The subsoil extends to a depth of about 60 inches. It is mottled. The upper part is brown and grayish brown, friable loam and light brownish gray, friable sandy loam. The next part is pale brown, very friable and dark brown, friable sand. The lower part is very dark grayish brown and light gray, firm clay loam.

Nachusa soils are nearly level and are somewhat poorly drained. Typically, the surface layer is black,

friable silt loam about 11 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part is dark grayish brown, friable silt loam and silty clay loam. The next part is yellowish brown, firm clay loam. The lower part is yellowish brown, friable loam.

Minor in this association are Dakota, Dickinson, Odell, Parr, Rockton, and Thorp Variant soils. The well drained Dakota and somewhat excessively drained Dickinson soils are generally gently sloping. They are on dune-shaped ridges. The somewhat poorly drained Odell soils contain more clay in the lower part of the subsoil than the major soils. They are nearly level. The well drained Parr soils are gently sloping and sloping. They are on convex ridges and side slopes. The well drained Rockton soils are on ridges and side slopes. They are moderately deep over bedrock. The poorly drained Thorp Variant soils are in closed depressions.

In most areas this association is cultivated. It is well suited to cultivated crops. A seasonal high water table is the major limitation. Measures that maintain the drainage system are needed in areas of the poorly drained soils.

The Clyde soils are unsuited to dwellings and septic tank absorption fields because of wetness. The Binghampton and Nachusa soils are moderately suited or poorly suited to dwellings with basements and to septic tank absorption fields. The seasonal high water table and the restricted permeability are the major limitations. If the Binghampton soils are used as septic tank absorption fields, the poor filtering capacity of the subsoil may result in the pollution of ground water. The association is poorly suited to local roads and streets. Low strength, wetness, and frost action are the major limitations.

Nearly Level to Steep, Excessively Drained, Somewhat Excessively Drained, Well Drained, and Poorly Drained Soils on Outwash Plains, Till Plains, Dunes, and Terraces

These soils are mostly on outwash plains, dunes, and till plains. Soil blowing and water erosion are the major management concerns. Droughtiness also is a problem.

5. Chelsea-Sparta-Orio Association

Sandy and loamy, excessively drained and poorly drained soils that formed in eolian sand or in loamy sediments and the underlying sandy outwash

This association consists of gently sloping to steep soils on dunes and ridges and nearly level soils in low areas between the dunes and ridges. The dunes and ridges generally have short, convex slopes and are irregular in shape. Slopes range from 0 to 35 percent.

This association makes up about 6 percent of the county. It is about 30 percent Chelsea soils, 20 percent Sparta soils, 15 percent Orio soils, and 35 percent minor soils.

Chelsea soils are gently sloping to steep and are excessively drained. Typically, the surface layer is very dark gray, very friable fine sand about 3 inches thick. The subsurface layer is loose fine sand about 37 inches thick. The upper part is dark brown. The next part is dark yellowish brown. The lower part is brownish yellow. The subsoil to a depth of 60 inches is brownish yellow, loose sand. It has thin bands of dark brown, very friable loamy sand.

Sparta soils are gently sloping to steep and are excessively drained. Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, very friable loamy sand about 8 inches thick. The subsoil is about 26 inches thick. It is dark yellowish brown and very friable. The upper part is loamy sand. The lower part is sand. The substratum to a depth of 60 inches is yellowish brown, loose sand.

Orio soils are nearly level and are poorly drained. Typically, the surface layer is black, friable sandy loam about 11 inches thick. The subsurface layer is friable sandy loam about 10 inches thick. The upper part is dark grayish brown. The lower part is gray and mottled. The subsoil is about 26 inches thick. It is mottled. The upper part is dark gray, friable sandy clay loam. The next part is dark gray, very friable sandy loam. The lower part is gray, very friable loamy sand. The substratum to a depth of 60 inches is dark grayish brown, mottled, loose sand.

Minor in this association are Adrian, Ayr, Billett, Dakota, Dickinson, Gilford, Hoopeston, La Hogue, Oakville, Parr, and Selma soils. The very poorly drained Adrian soils are in depressions. They formed in organic material. The well drained Ayr, Billett, Dakota, and Parr soils are in nearly level to sloping areas. The somewhat excessively drained Dickinson soils are nearly level or gently sloping and are on ridges. The very poorly drained Gilford and poorly drained Selma soils are in drainageways. The somewhat poorly drained Hoopeston and La Hogue soils are in nearly level areas. The well drained Oakville soils are in areas severely eroded by wind.

Most of this association is used for cultivated crops. Some is used for woodland, wildlife habitat, and recreational development. The gently sloping Chelsea and Sparta soils are poorly suited to cultivated crops, and in the more sloping areas they are unsuited. Orio soils are moderately suited. Soil blowing, water erosion, available water capacity, and the seasonal high water table are the major limitations. Irrigation sometimes is used to supply additional water.

The Chelsea and Sparta soils are poorly suited to pasture and moderately suited or poorly suited to woodland wildlife habitat. The Orio soils are well suited to pasture and moderately suited to woodland wildlife habitat. Seedling mortality, the seasonal high water table, and slope are the major limitations.

The Chelsea and Sparta soils are well suited or moderately suited to dwellings. They are unsuited to conventional septic tank absorption fields because of the poor filtering capacity, which may result in the pollution

of ground water. The Orio soils are unsuited to dwellings and septic tank absorption fields because of ponding.

6. Parr-Ayr-Chelsea Association

Loamy and sandy, well drained and excessively drained soils that formed in loess or loamy eolian material and the underlying glacial till or in sandy eolian deposits

This association consists mainly of gently sloping to steep soils on ridgetops, side slopes on till plains, and dunes. Slopes range from 1 to 35 percent.

This association makes up about 7 percent of the county. It is about 20 percent Parr and similar soils, 15 percent Ayr and similar soils, 15 percent Chelsea and similar soils, and 50 percent minor soils.

Parr soils are gently sloping and sloping and are well drained. Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 11 inches thick. The subsoil is friable clay loam about 18 inches thick. The upper part is dark yellowish brown. The lower part is dark brown. The substratum to a depth of 60 inches is brown, mottled, friable, mildly alkaline loam.

Ayr soils are gently sloping and are well drained. Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable sandy loam about 8 inches thick. The subsoil is about 31 inches thick. The upper part is dark yellowish brown, friable sandy loam. The lower part is dark brown, firm loam. The substratum to a depth of 60 inches is dark brown, firm, mildly alkaline loam.

Chelsea soils are gently sloping to steep and are excessively drained. Typically, the surface layer is very dark gray, very friable fine sand about 3 inches thick. The subsurface layer is loose fine sand about 37 inches thick. The upper part is dark brown. The next part is dark yellowish brown. The lower part is brownish yellow. The subsoil to a depth of 60 inches is brownish yellow, loose sand. It has thin bands of dark brown, very friable loamy sand.

Minor in this association are Billett, Clyde, Comfrey, Dickinson, Hoopeston, La Hogue, Morocco, Odell, Orio, and Selma soils. The well drained Billett soils have a surface layer of fine sandy loam. They are nearly level to sloping and are on side slopes and ridgetops. The nearly level, poorly drained Clyde soils are at the head of drainageways. The poorly drained Comfrey and Selma soils are in drainageways. The somewhat excessively drained Dickinson soils are nearly level to sloping. The nearly level, somewhat poorly drained Hoopeston, La Hogue, Morocco, and Odell soils are on outwash plains and till plains. The poorly drained Orio soils are in depressions.

Most of this association is cultivated. The Parr and Ayr soils are well suited or moderately suited to cultivated crops. The Chelsea soils are poorly suited or unsuited. Soil blowing, water erosion, and droughtiness are the major limitations. Irrigation sometimes is used to supply additional water.

The Parr and Ayr soils are well suited or moderately suited to dwellings and septic tank absorption fields. The steep Chelsea soils are poorly suited to dwellings and are unsuited to conventional septic tank absorption fields. The restricted permeability, the shrink-swell potential, the slope, and the poor filtering capacity are the major limitations. The association is moderately suited or poorly suited to local roads and streets. Frost action, low strength, slope, and erosion are the major limitations.

7. Waukee-Dickinson-Dakota Association

Silty and loamy, well drained and somewhat excessively drained soils that formed in loamy eolian material or in loamy and silty sediments and the underlying glacial outwash

This association consists of nearly level to sloping soils on terraces and dunes. Shallow depressions are throughout the association. Slopes range from 0 to 10 percent.

This association makes up about 4 percent of the county. It is about 23 percent Waukee soils, 20 percent Dickinson soils, 20 percent Dakota soils, and 37 percent minor soils.

Waukee soils are nearly level and are well drained. Typically, the surface layer is very dark gray, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 26 inches thick. It is dark yellowish brown and friable. The upper part is silt loam. The next part is sandy clay loam. The lower part is loamy sand. The substratum to a depth of 60 inches is dark yellowish brown and yellowish brown, loose sand.

Dickinson soils are nearly level to sloping and are somewhat excessively drained. Typically, the surface layer is very dark grayish brown, friable sandy loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable sandy loam about 9 inches thick. The subsoil is about 31 inches thick. The upper part is dark yellowish brown, friable sandy loam. The lower part is dark yellowish brown and brown, very friable loamy sand. The substratum to a depth of 60 inches is yellowish brown, mottled, loose sand.

Dakota soils are gently sloping and are well drained. Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable sandy loam about 8 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, friable loam. The next part is dark yellowish brown, friable sandy loam. The lower part is yellowish brown, very friable loamy sand. The substratum to a depth of 60 inches is yellowish brown, loose sand.

Minor in this association are Billett, Chelsea, Comfrey, Du Page, Lawson, Martinsville, Millington, Orio, Plano, Ross, Sparta, and Warsaw soils. The well drained Billett, Martinsville, and Warsaw and moderately well drained

Plano soils are on stream terraces. The sandy Chelsea and Sparta soils are in the higher dune-shaped areas. The poorly drained Comfrey and Millington, moderately well drained Du Page, and somewhat poorly drained Lawson soils are on flood plains. The poorly drained, nearly level Orio soils are mainly in depressions. The well drained Ross soils are on rarely flooded second bottoms.

Most of this association is cultivated. The major soils are moderately suited or poorly suited to cultivated crops. Available water capacity, water erosion, and soil blowing are the major limitations. Irrigation sometimes is used to supply additional water.

This association is well suited to dwellings and poorly suited to septic tank absorption fields. The poor filtering capacity is the major limitation in septic tank absorption fields. The association is well suited or moderately suited to local roads and streets. Frost action and low strength are the major limitations.

Nearly Level to Sloping, Well Drained to Poorly Drained Soils on Loess-Covered Uplands, Till Plains, and Outwash Plains

These soils are on uplands, till plains, and outwash plains covered by deep loess. Measures that help to control water erosion and maintain the subsurface drainage system are the major management needs.

8. Tama-Muscatine-Sable Association

Silty, moderately well drained to poorly drained soils that formed in loess

This association consists mainly of nearly level to gently sloping soils on broad ridges and upland flats. Scattered sloping areas are throughout the association. Slopes range from 0 to 10 percent.

This association makes up about 14 percent of the county. It is about 35 percent Tama soils, 20 percent Muscatine soils, 15 percent Sable soils, and 30 percent minor soils (fig. 4).

Tama soils are nearly level to sloping and are moderately well drained. Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is friable silty clay loam about 38 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown and

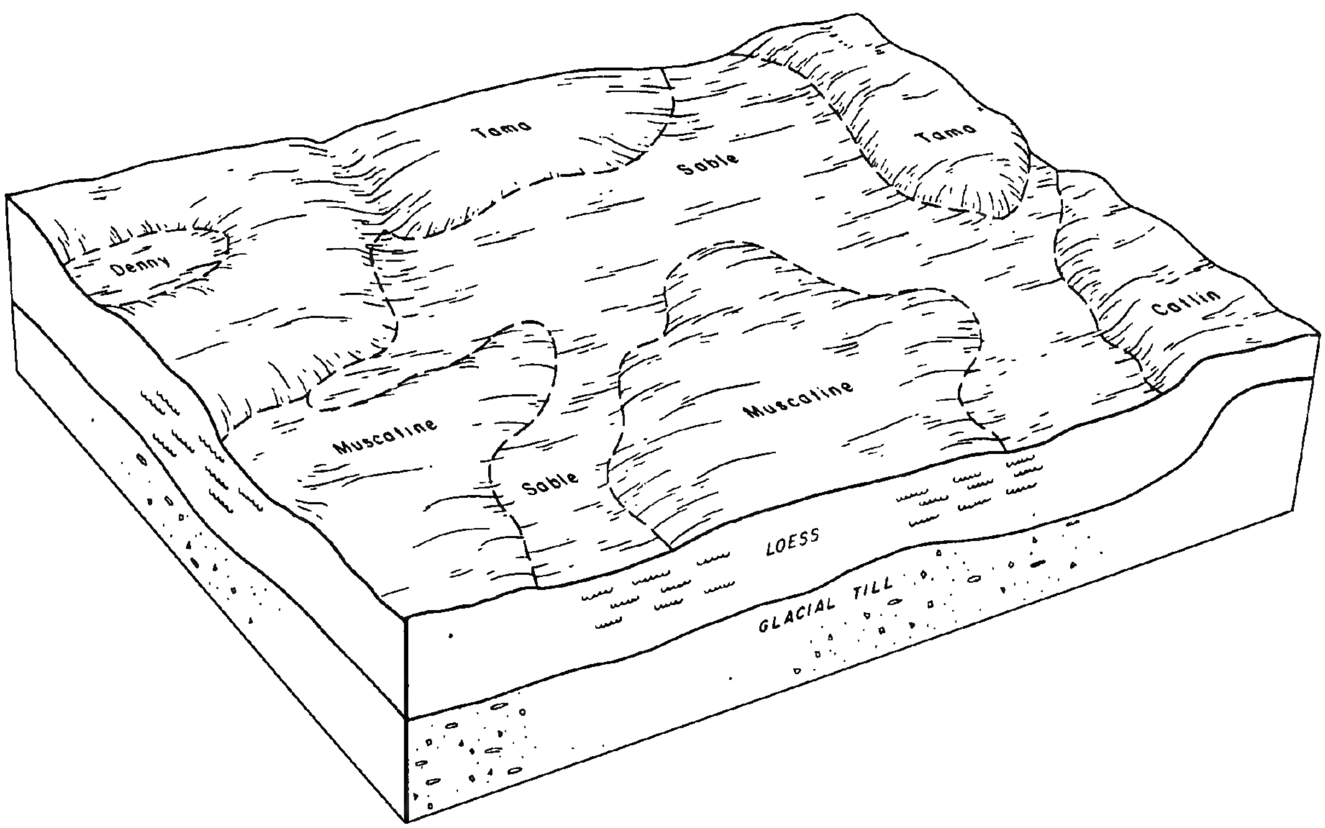


Figure 4.—Pattern of soils and underlying material in the Tama-Muscatine-Sable association.

mottled. The substratum to a depth of 60 inches is dark yellowish brown, mottled, friable, mildly alkaline silt loam.

Muscatine soils are nearly level and are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 8 inches thick. The subsurface layer is very dark gray, friable silt loam about 9 inches thick. The subsoil is about 32 inches thick. It is friable. The upper part is dark grayish brown silty clay loam. The next part is grayish brown and brown, mottled silty clay loam. The lower part is grayish brown, mottled silt loam. The substratum to a depth of 60 inches is light brownish gray, mottled, friable, mildly alkaline silt loam.

Sable soils are nearly level and are poorly drained. Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 5 inches thick. The subsoil is mottled, friable silty clay loam about 39 inches thick. The upper part is dark gray. The lower part is olive gray. The substratum to a depth of 60 inches is olive gray, mottled, friable, mildly alkaline silt loam.

Minor in this association are Ashdale, Catlin, Denny, Lawson, and Otter soils. The well drained Ashdale and moderately well drained Catlin soils are gently sloping or sloping. Ashdale soils contain more clay in the lower part of the subsoil than the major soils, and Catlin soils contain more sand in the lower part of the subsoil. The poorly drained Denny soils are subject to ponding and are in shallow depressions. The somewhat poorly drained Lawson and poorly drained Otter soils are on bottom land.

In most areas this association is cultivated. It is well suited or moderately suited to cultivated crops. Erosion is the major hazard on the gently sloping and sloping soils. The seasonal high water table is the major limitation of the somewhat poorly drained and poorly drained soils. Measures that maintain the drainage system are needed.

This association is moderately suited or poorly suited to dwellings with basements and to septic tank absorption fields. The seasonal high water table and the restricted permeability are the major limitations. The association is poorly suited to local roads and streets. Low strength, frost action, and wetness are the major limitations.

9. Catlin-Drummer Association

Silty, moderately well drained and poorly drained soils that formed in loess and the underlying glacial till or glacial outwash

This association consists mainly of nearly level to sloping soils on glacial till plains or outwash plains. Shallow, closed depressions are throughout the association. Slopes range from 0 to 10 percent.

This association makes up about 10 percent of the county. It is about 55 percent Catlin and similar soils, 20 percent Drummer and similar soils, and 25 percent minor soils.

Catlin soils are nearly level to sloping and are moderately well drained. Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 45 inches thick. It is friable. The upper part is dark brown silty clay loam. The next part is brown and yellowish brown, mottled silty clay loam and silt loam. The lower part is yellowish brown, mottled, mildly alkaline loam. The substratum to a depth of 60 inches is yellowish brown, mottled, friable, mildly alkaline loam.

Drummer soils are nearly level and are poorly drained. Typically, the surface layer is black, friable silty clay loam about 10 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 6 inches thick. The subsoil extends to a depth of 60 inches. It is mottled and friable. The upper part is gray silty clay loam. The next part is olive gray silty clay loam. The lower part is olive gray loam and sandy clay loam.

Minor in this association are Elburn, Flanagan, Muscatine, and Tama soils. The nearly level, somewhat poorly drained Elburn, Flanagan, and Muscatine soils are in broad open areas. The moderately well drained Tama soils have a dark surface layer. They are on ridgetops and side slopes along drainageways.

In most areas this association is cultivated. It is well suited to cultivated crops. Erosion is the major hazard on the gently sloping and sloping soils. The seasonal high water table is the major limitation of the somewhat poorly drained and poorly drained soils. Measures that maintain the drainage system are needed.

This association is moderately suited or poorly suited to dwellings with basements and to septic tank absorption fields. The seasonal high water table and the restricted permeability are the major limitations. The association is poorly suited to local roads and streets. Low strength, frost action, and wetness are the major limitations.

10. Jasper-Vanpetten-Nachusa Association

Silty and loamy, well drained to somewhat poorly drained soils that formed in loamy, silty, and sandy material and the underlying weathered glacial till

This association consists mainly of nearly level to sloping soils on outwash plains and glacial till plains. Scattered irregularly shaped sand ridges and lower, wetter areas are throughout the association. Slopes range from 0 to 10 percent.

This association makes up about 6 percent of the county. It is about 35 percent Jasper soils, 15 percent Vanpetten and similar soils, 15 percent Nachusa and similar soils, and 35 percent minor soils.

Jasper soils are nearly level to sloping and are well drained. Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer is dark brown, friable silt loam about 4

inches thick. The subsoil is about 30 inches thick. It is dark yellowish brown and friable. The upper part is clay loam. The lower part is silt loam. The substratum to a depth of 60 inches is dark yellowish brown, friable silt loam.

Vanpetten soils are gently sloping and are moderately well drained. Typically, the surface layer is very dark gray, friable loam about 6 inches thick. The subsurface layer is very dark grayish brown, friable loam about 6 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark brown, friable silt loam. The next part is dark brown, yellowish brown, and dark yellowish brown, very friable sandy loam, coarse sand, and loamy coarse sand. The lower part is gray, mottled, friable clay loam.

Nachusa soils are nearly level and are somewhat poorly drained. Typically, the surface layer is black, friable silt loam about 11 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part is dark grayish brown, friable silt loam and silty clay loam. The next part is yellowish brown, firm clay loam. The lower part is yellowish brown, friable loam.

Minor in this association are Dickinson, Hitt, Rockton, Sogn, Sparta, Thorp Variant, and Whalan soils. The somewhat excessively drained Dickinson and excessively drained Sparta soils are gently sloping and are on dune-shaped ridges. The well drained Hitt soils have bedrock at a depth of 40 to 60 inches. The well drained Rockton soils are gently sloping and sloping and are moderately deep over bedrock. The somewhat excessively drained, shallow Sogn soils and the well drained, moderately deep Whalan soils are on side slopes along drainageways. The poorly drained Thorp Variant soils are in depressions.

In most areas this association is cultivated. It is well suited or moderately suited to cultivated crops. The seasonal high water table and erosion are the major limitations. Measures that maintain the drainage system are needed.

This association is moderately suited or poorly suited to dwellings with basements and to septic tank absorption fields. The restricted permeability, the seasonal high water table, and the poor filtering capacity are the major limitations. The association is moderately suited or poorly suited to local roads and streets. Low strength, the shrink-swell potential, and frost action are the major limitations.

Gently Sloping to Steep, Moderately Well Drained to Somewhat Excessively Drained Soils on Uplands, Till Plains, and Moraines

These soils are on uplands, till plains, and moraines covered by deep loess, glacial till, and material weathered from bedrock. Slope is the primary limitation. Water erosion is the main hazard.

11. Saybrook-Parr Association

Silty, moderately well drained and well drained soils that formed in loess and the underlying glacial till

This association consists of gently sloping and sloping soils on loess-covered moraines. Shallow depressions and drainageways are common. Slopes range from 2 to 10 percent.

This association makes up about 12 percent of the county. It is about 45 percent Saybrook and similar soils, 35 percent Parr and similar soils, and 20 percent minor soils.

Saybrook soils are gently sloping and sloping and are moderately well drained. Typically, the surface layer is mixed very dark gray and dark yellowish brown, friable silt loam about 8 inches thick. The subsoil is about 25 inches thick. The upper part is brown, friable silty clay loam. The next part is dark yellowish brown, mottled, friable silty clay loam and firm clay loam. The lower part is brown, mottled, friable loam. The substratum to a depth of 60 inches is brown, mottled, friable, moderately alkaline loam.

Parr soils are gently sloping and sloping, are eroded, and are well drained. Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 7 inches thick. The subsoil is friable clay loam about 20 inches thick. The upper part is dark yellowish brown, and the lower part is dark brown. The substratum to a depth of 60 inches is brown, friable, mildly alkaline loam.

Minor in this association are Drummer, Elburn, Flanagan, Miami, Sable, and Warsaw soils. The poorly drained Drummer and Sable soils are in drainageways and depressions. The somewhat poorly drained Elburn and Flanagan soils are on the lower slopes. The well drained Miami soils are gently sloping and sloping and are along drainageways. They have a light colored surface layer. The well drained Warsaw soils are gently sloping and sloping. They contain more sand than the major soils.

In most areas this association is cultivated. It is well suited or moderately suited to cultivated crops. Erosion is the major hazard.

The major soils are well suited or moderately suited to dwellings with basements and to septic tank absorption fields. They are poorly suited to local roads and streets. Low strength is a limitation, and frost action is a hazard.

12. Fayette-Birkbeck-Miami Association

Silty, well drained and moderately well drained soils that formed in loess or in loess and the underlying glacial till

This association consists mainly of gently sloping to moderately steep soils on uplands covered by deep loess and on dissected, loess-covered glacial till plains. Slopes range from 2 to 25 percent.

This association makes up about 4 percent of the county. It is about 30 percent Fayette and similar soils, 25 percent Birkbeck and similar soils, 25 percent Miami and similar soils, and 20 percent minor soils.

Fayette soils are gently sloping to strongly sloping and are well drained. Typically, the surface layer is mixed dark brown and dark yellowish brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches. It is friable. The upper part is dark yellowish brown silt loam and silty clay loam. The next part is dark yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silt loam.

Birkbeck soils are gently sloping and sloping and are moderately well drained. Typically, the surface layer is mixed dark grayish brown and dark brown, friable silt loam about 9 inches thick. The subsoil is about 35 inches thick. It is friable. The upper part is dark brown silty clay loam. The next part is yellowish brown, mottled silty clay loam. The lower part is dark brown, mottled clay loam. The substratum to a depth of 60 inches is dark brown, mottled, firm, mildly alkaline loam.

Miami soils are gently sloping to moderately steep and are well drained. Typically, the surface layer is mixed dark grayish brown and dark yellowish brown, friable silt loam about 6 inches thick. The subsoil is about 20 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The lower part is brown, firm clay loam. The substratum to a depth of 60 inches is light brown, friable, mildly alkaline loam.

Minor in this association are Comfrey, Lawson, Otter, Palsgrove, Sogn, and Whalan soils. The poorly drained Comfrey and Otter and somewhat poorly drained Lawson soils are in drainageways. The well drained, sloping Palsgrove soils are on side slopes. The somewhat excessively drained Sogn and well drained Whalan soils are strongly sloping to steep. They are on side slopes along drainageways.

In most areas this association is cultivated. It is well suited or moderately suited to cultivated crops and well suited to woodland and recreational development. Erosion is the major hazard.

This association is moderately suited or poorly suited to dwellings with basements and to septic tank absorption fields. The slope, the seasonal high water table, the shrink-swell potential, and the restricted permeability are the major limitations. The association is poorly suited to local roads and streets. Slope, low strength, and frost action are the major limitations.

13. Eleva-Griswold-Whalan Association

Loamy, somewhat excessively drained and well drained soils that formed in residuum of sandstone, in glacial till, or in glacial till and the underlying residuum of limestone

This association consists of gently sloping to steep soils on side slopes along the major drainageways. Slopes range from 2 to 35 percent.

This association makes up about 2 percent of the county. It is about 20 percent Eleva and similar soils, 20 percent Griswold and similar soils, 15 percent Whalan and similar soils, and 45 percent minor soils.

Eleva soils are strongly sloping to steep and are somewhat excessively drained. Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 4 inches thick. The subsoil is about 28 inches thick. It is very friable. The upper part is dark yellowish brown and yellowish brown fine sandy loam. The lower part is dark yellowish brown sandy loam and fine sandy loam. Yellowish brown, weakly cemented sandstone bedrock is at a depth of about 32 inches. It is underlain by very pale brown, strongly cemented sandstone at a depth of about 37 inches.

Griswold soils are sloping and strongly sloping and are well drained. Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable loam about 7 inches thick. The subsoil is about 27 inches thick. It is dark yellowish brown and friable. The upper part is clay loam. The next part is sandy clay loam. The lower part is sandy loam. The substratum to a depth of 60 inches is brownish yellow and light yellowish brown, friable, mildly alkaline sandy loam.

Whalan soils are gently sloping to steep and are well drained. Typically, the surface layer is very dark grayish brown, friable loam about 4 inches thick. The subsurface layer is dark yellowish brown and very dark grayish brown, friable loam about 3 inches thick. The subsoil is about 16 inches thick. It is firm. The upper part is dark brown clay loam. The lower part is strong brown clay. Fractured limestone bedrock is at a depth of about 23 inches.

Minor in this association are Comfrey, Rodman, and Sogn soils. The poorly drained Comfrey soils are on bottom land. The somewhat excessively drained, shallow, strongly sloping to steep Sogn soils are on side slopes along the major drainageways. The excessively drained, moderately steep, gravelly Rodman soils are on upland knolls and on side slopes along the major drainageways.

This association is used mainly for cultivated crops. In the steep areas it is wooded. It is moderately suited or poorly suited to cultivated crops. Water erosion, soil blowing, and droughtiness are the major limitations.

The Eleva and Whalan soils are poorly suited to woodland, and the Griswold soils are well suited. Slope, erosion, and seedling mortality are the major limitations.

The major soils are moderately suited or poorly suited to dwellings with basements and to septic tank absorption fields. Slope, the depth to bedrock, and the poor filtering capacity are the major limitations. The association is moderately suited or poorly suited to local roads and streets. Slope, erosion, low strength, and frost action are the major limitations.

Broad Land Use Considerations

Most of the acreage in Lee County is used for cultivated crops, mainly corn and soybeans. Other uses include pasture, woodland, urban development, recreational development, and wildlife habitat. The suitability of the soils for these uses varies significantly.

Cropland is the major land use in all of the associations. Association 1 is subject to flooding, mostly in the spring. Crop damage generally is slight, but planting is sometimes delayed. Wetness is a problem in associations 1, 2, 3, and 4 and in areas of the Orio soils in association 5. Associations 5, 6, and 7 are susceptible to soil blowing and water erosion. Irrigation is needed in associations 5, 6, and 7 because the soils tend to be droughty. In associations 8, 9, and 10, water erosion and wetness are problems. The wetness generally is not a problem, however, in the part of association 8 in Palmyra Township. In associations 11, 12, and 13, water erosion is a hazard.

A small acreage in the county is pasture or hayland. Associations 12 and 13 have substantial acreages of pasture. All of the associations are well suited to grasses and legumes. Drought-resistant species should be planted in associations 5, 6, and 7. Species adapted to wetness can be grown on the poorly drained soils in associations 1, 2, 3, 4, 5, 8, 9, and 10.

A small acreage in the county is woodland. Most of the woodland is in associations 5, 6, 12, and 13. The droughty soils in associations 5, 6, and 13 are well suited to conifers but are poorly suited to hardwoods. Association 12 is well suited to woodland. On some of the woodland, the equipment limitation is moderate or severe. Using special equipment or harvesting during the drier periods helps to overcome this limitation.

Areas surrounding Dixon and Amboy commonly are used for urban development. The areas to be used for urban development should be carefully selected. The general soil map is helpful in planning general areas, but it cannot be used for selecting specific construction sites. The soils in all of the associations have limitations that affect urban uses. Some of these limitations can be overcome more easily than others. When areas are selected for urban development, the amount of prime farmland in a given area should be considered along with the limitations of the soils.

Association 1 is generally unsuited to urban development because large areas are subject to flooding. In associations 2, 3, 4, 5, 8, 9, and 10, large areas are poorly suited to urban development because of wetness. Some of the soils in associations 5, 6, 7, 10, and 13 have a poor filtering capacity, which is a limitation in septic tank absorption fields. In many areas association 13 is poorly suited to urban development because of the depth to bedrock. Association 11 is moderately suited to urban development, but wetness, the shrink-swell potential, low strength, slope, and restricted permeability are limitations.

The suitability of the soils in the county for recreational development ranges from good to poor, depending on the intensity of the expected use. Association 12 is generally well suited to intensive recreational uses. Association 1 is poorly suited because of flooding. The steep slopes in associations 5, 12, and 13 limit the suitability of the soils for intensive uses, such as playgrounds and camp areas. Small areas suitable for intensive uses generally are available even in the associations that generally are poorly suited to these uses. All of the associations are suited to paths and trails for hiking or horseback riding.

The suitability for wildlife habitat is good throughout the county. At least some of the soils in all the associations are well suited to openland wildlife habitat. Farming practices, such as fall plowing and fence removal, however, have been particularly detrimental to openland wildlife populations in many areas. Crop residue and brushy fence rows are needed for winter habitat. Brushy fence rows and unmowed field borders are needed for summer nesting. The suitability for woodland wildlife habitat is good in associations 5, 6, 11, and 13. The soils on flood plains in associations 1 and 2 and the poorly drained soils and marsh areas in association 5 are well suited to wetland wildlife habitat. Unless drained, Comfrey and Orio soils are especially well suited to shallow water areas for waterfowl.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the substratum. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Parr silt loam, 2 to 5 percent slopes, is one of several phases in the Parr series.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

In Ogle, DeKalb, and La Salle Counties, 24 soil series join with similar series that have different names in Lee County. Of these, eight in Ogle County, eight in DeKalb County, and eight in La Salle County were not included in the soil survey of Lee County. Also, some of the map units in the adjacent counties that join the map units of the same soil series in Lee County have different slope or erosion classes. These differences either are the result of the insignificant extent of the soil series or map units or are the result of conceptual changes in the soil classification system.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

27B—Miami silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on till plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 8 inches thick. The subsoil is about 30 inches thick. It is friable. The upper part is dark yellowish brown clay loam. The next part is strong brown clay loam. The lower part is dark yellowish brown loam. The substratum to a depth of 60 inches is brown, friable, mildly alkaline loam. In places the subsoil is thinner. In a few places it contains less sand.

Included with this soil in mapping are small areas of the moderately well drained Birkbeck soils and the somewhat poorly drained Odell soils. Birkbeck soils are in positions on the landscape similar to those of the Miami soil. Odell soils are on the lower slopes. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Miami soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is neutral. Root growth is somewhat limited by the massive loam glacial till below a depth of about 38 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are used for cultivated crops. Some are used for woodland. This soil is well suited to cultivated crops, hay, and pasture, to woodland, and to dwellings

with basements. It is moderately suited to septic tank absorption fields and dwellings without basements and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, by terraces, or by zero tillage.

In the areas used for woodland, plant competition is the main management concern. It can be controlled by applying chemicals and by harvesting mature trees, cutting cull trees, and thinning and weeding. Woodland should be protected from fire and grazing.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

27C2—Miami silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on convex slopes along upland drainageways. Individual areas are irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is mixed dark grayish brown and dark yellowish brown, friable silt loam about 6 inches thick. The subsoil is about 20 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The lower part is brown, firm clay loam. The substratum to a depth of 60 inches is light brown, friable, mildly alkaline loam. In some places the subsoil is thinner. In other places it contains less sand and is thicker. In some areas the substratum is stratified and contains more sand.

Included with this soil in mapping are small areas of Lawson and Whalan soils. The somewhat poorly drained Lawson soils are in drainageways. Whalan soils are on the more sloping parts of the landscape. They have limestone bedrock at a depth of 20 to 40 inches. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Miami soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is strongly acid to slightly acid. Root growth is somewhat limited by the massive loam glacial till below a depth of about 26 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay, pasture, and woodland and to dwellings with basements. It is moderately suited to septic tank absorption fields and dwellings without basements and is poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes. Zero tillage combined with contour farming also helps to prevent excessive soil losses.

If this soil is used for woodland, plant competition is the main management concern. It can be controlled by applying chemicals and by harvesting mature trees, cutting cull trees, and thinning and weeding. Woodland should be protected from fire and grazing.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

27D3—Miami clay loam, 8 to 15 percent slopes, severely eroded. This strongly sloping, well drained soil is on side slopes in the uplands. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is mixed brown and dark brown, friable clay loam about 7 inches thick. The subsoil is yellowish brown, friable clay loam about 17 inches thick. The substratum to a depth of 60 inches is brown and light brown, friable, mildly alkaline loam. In some places the subsoil is thinner. In other places the surface layer contains less clay and is darker. In a few places erosion has removed all of the original surface layer and the subsoil.

Included with this soil in mapping are small areas of the poorly drained Sable silt loam, overwash, and small areas of the moderately well drained Saybrook soils. Sable soils are in depressions. Saybrook soils are upslope from the Miami soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Miami soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is low. The subsoil is neutral. The surface layer is friable but becomes hard and cloddy if tilled when wet. Root growth is somewhat limited by the massive loam glacial

till below a depth of about 24 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is poorly suited to cultivated crops and to local roads and streets. It is well suited to woodland. It is moderately suited to hay and pasture and to septic tank absorption fields and dwellings.

In areas used for corn, soybeans, and small grain, erosion is a hazard. Zero tillage and contour farming combined with a cropping sequence that is dominated by grasses and legumes help to control erosion. A permanent cover of pasture plants or hay also helps to prevent excessive soil losses.

If this soil is used for woodland, plant competition is the main management concern. It can be controlled by applying chemicals and by harvesting mature trees, cutting cull trees, and thinning and weeding. Woodland should be protected from fire and grazing.

The restricted permeability and the slope are limitations if this soil is used as a septic tank absorption field. Enlarging the absorption field and installing the absorption field laterals on the contour help to overcome these limitations.

The shrink-swell potential, the slope, and erosion are limitations if this soil is used as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling may be needed when sites for dwellings are prepared. Sediment trap basins can be used during construction to reduce sedimentation of surface water. Adding mulch until seedings are established helps to control erosion. Low strength, slope, frost action, and the shrink-swell potential are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by low strength, frost action, and shrinking and swelling. Cutting and filling may be needed when roads and streets are constructed.

The land capability classification is IVe.

27E—Miami loam, 15 to 25 percent slopes. This moderately steep, well drained soil is on side slopes along drainageways. Individual areas are elongated and range from 4 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 3 inches thick. The subsurface layer is grayish brown, friable loam about 3 inches thick. The subsoil is about 24 inches thick. It is friable. The upper part is brown loam. The lower part is strong brown clay loam. The substratum to a depth of 60 inches is brown, friable, mildly alkaline loam. In some places the surface layer, the subsurface layer, and the upper part of the subsoil contain less sand. In other places the substratum contains more sand.

Included with this soil in mapping are small areas of Birkbeck and Fayette soils. The moderately well drained Birkbeck soils have a silty surface layer and subsoil. They are in the less sloping areas. Fayette soils are silty to a depth of 60 inches. They are on the less sloping ridgetops above the Miami soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Miami soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The subsoil is medium acid or slightly acid. The shrink-swell potential and the potential for frost action are moderate.

Most areas are wooded. This soil is well suited to woodland and to woodland wildlife habitat. It is poorly suited to septic tank absorption fields, dwellings, and local roads and streets.

In the areas used for woodland, the erosion hazard, the equipment limitation, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Plant competition can be controlled by applying chemicals.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the slope. Planting on the contour and maintaining a ground cover help to control erosion. The habitat should be protected from fire and grazing.

The restricted permeability and the slope are limitations if this soil is used as a septic tank absorption field. Enlarging the absorption field and installing the absorption field laterals on the contour help to overcome these limitations.

The shrink-swell potential, the slope, and erosion are limitations if this soil is used as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling may be needed when sites for dwellings are prepared. Sediment trap basins can be used during construction to reduce sedimentation of surface water. Adding mulch until seedings are established helps to control erosion. Low strength, slope, frost action, and the shrink-swell potential are limitations on sites for local roads and streets. Strengthening or replacing the base

material helps to prevent the damage caused by low strength, frost action, and shrinking and swelling. Cutting and filling may be needed when roads and streets are constructed.

The land capability classification is VIe.

36A—Tama silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsoil is about 46 inches thick. It is friable. The upper part is dark brown silt loam. The next part is dark yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled, friable silt loam. The substratum to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In places it contains more sand. In a few places the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Denny and Sable soils. Denny soils are in shallow depressions. Sable soils are on the slightly lower parts of the landscape. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid or neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields and poorly suited to local roads and streets.

This soil has few limitations when used for corn, soybeans, and small grain. Returning crop residue to the soil or adding other organic material helps to maintain fertility and increases the rate of water infiltration.

Wetness is a limitation if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the wetness is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains around basement foundations help to remove the excess water. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is I.

36B—Tama silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on uplands. Individual areas are irregular in shape and range from 3 to 2,000 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is friable silty clay loam about 38 inches thick. The upper part is dark brown, and the lower part is dark yellowish brown and mottled. The substratum to a depth of 60 inches is dark yellowish brown, mottled, friable, mildly alkaline silt loam. In some places the surface layer is thinner. In other places the lower part of the subsoil and the substratum contain more sand. In some areas the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Sable soils. These soils are in shallow depressions and drainageways. They make up 4 to 10 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

Wetness is a limitation if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the wetness is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains around basement foundations help to remove the excess water. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

36C2—Tama silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is along upland drainageways. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is mixed very dark gray and dark brown, friable silt loam about 7 inches thick. The

subsoil extends to a depth of 60 inches. It is friable. The upper part is dark brown silt loam and dark yellowish brown, mottled silty clay loam. The lower part is brownish yellow, mottled silt loam. In some places the surface layer is thinner. In other places the lower part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson soils. These soils are in drainageways. They make up 4 to 8 percent of the unit.

Water and air move through the Tama soil at a moderate rate. Surface runoff is rapid in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid to mildly alkaline. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay and pasture. It is moderately suited to dwellings and septic tank absorption fields and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes grasses and legumes help to prevent excessive soil losses.

Wetness is a limitation if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the wetness is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains around basement foundations help to remove the excess water. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

41A—Muscatine silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on the lower slopes and in broad low areas on uplands. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is black, friable silt loam about 8 inches thick. The subsurface layer is very dark gray, friable silt loam about 9 inches thick. The subsoil is about 32 inches thick. It is friable. The upper part is dark grayish brown silty clay loam. The next part is grayish brown and brown, mottled silty clay loam. The lower part is grayish brown, mottled silt loam. The substratum to a depth of 60 inches is light brownish gray, mottled, friable, mildly alkaline silt loam. In places the lower part of the subsoil and the substratum are loam. In a few places the surface layer and the subsurface layer are thinner. In some areas the depth to a seasonal high water table is more than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Denny and Sable soils. Denny soils are in shallow depressions. Sable soils are slightly lower on the landscape than the Muscatine soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Muscatine soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 2.0 to 4.0 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is medium acid to neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings without basements and poorly suited to dwellings with basements and to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, artificial drainage may be needed. Subsurface drains function well if suitable outlets are available. Erosion is a hazard in areas where the slope is 1 percent or more. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting.

The seasonal high water table is a limitation if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water. Elevating the absorption field with suitable fill material and installing perimeter drains also help to overcome the wetness.

The wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains around foundations help to remove excess water. Frost action, low strength, and wetness are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by frost action and low strength. Open ditches help to remove the excess water.

The land capability classification is I.

45—Denny silt loam. This nearly level, poorly drained soil is in depressions on uplands. It is ponded for brief periods from March to June. Individual areas are irregular in shape and range from 4 to 30 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 9 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 46 inches thick. It is mottled. The upper part is grayish brown and light brownish gray, firm silty clay loam. The lower part is light brownish gray, friable silt loam. In some places the subsurface layer is thicker. In other places the upper part of the subsoil contains

less clay. In a few places the lower part of the subsoil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Muscatine soils. These soils are in the slightly higher areas. Their surface layer is thicker than that of the Denny soil, and their subsoil contains less clay. Also included are some areas that are ponded throughout most of the growing season. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Denny soil at a slow rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid or neutral. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is generally unsuited to septic tank absorption fields, dwellings, and local roads and streets because of the frequent ponding and the high shrink-swell potential in the subsoil.

This soil is sufficiently drained for corn, soybeans, and small grain, but the ponding is a hazard. The cultivated areas have been drained, but additional drainage may be needed. Subsurface drains combined with surface inlets or ditches help to drain the depressions.

The land capability classification is IIw.

60B2—La Rose loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained soil is on till plains. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 8 inches thick. The subsoil is brown, friable clay loam about 11 inches thick. The substratum to a depth of 60 inches is brown, calcareous loam. In some places the subsoil is thicker. In other places the surface layer is thinner and contains gravel.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Flanagan soils. These soils are in drainageways. They make up 2 to 10 percent of the unit.

Water and air move through the La Rose soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is neutral. Root growth is somewhat limited by the massive, firm loam glacial till below a depth of about 19 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to septic tank absorption fields and well suited to dwellings. It is poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

Frost action and low strength are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

60C2—La Rose loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on convex slopes along drainageways. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark grayish brown and brown, friable loam about 7 inches thick. The subsoil is brown, friable clay loam about 12 inches thick. The substratum to a depth of 60 inches is brown, firm, calcareous loam. In some places the subsoil is thicker. In other places the surface layer is thinner and contains gravel.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Flanagan soils. These soils are in drainageways. They make up 2 to 10 percent of the unit.

Water and air move through the La Rose soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is neutral. Root growth is somewhat limited by the massive, firm loam glacial till below a depth of about 19 inches. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay and pasture and to dwellings. It is moderately suited to septic tank absorption fields and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes grasses and legumes help to prevent excessive soil losses.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

Low strength and frost action are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

64B—Parr fine sandy loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 11 inches thick. The subsoil is friable clay loam about 18 inches thick. The upper part is dark yellowish brown. The lower part is dark brown. The substratum to a depth of 60 inches is brown, mottled, friable, mildly alkaline loam. In some places the surface layer and the subsoil are thinner. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Odell and excessively drained Sparta soils. Odell soils are in the lower landscape positions. Sparta soils are in the slightly higher dunal areas. They contain more sand in the subsoil and substratum than the Parr soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Parr soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is neutral. Root growth is somewhat limited by the massive loam glacial till below a depth of about 29 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops and to hay and pasture. It is moderately suited to septic tank absorption fields and dwellings without basements. It is well suited to dwellings with basements and moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing and water erosion are hazards. Also, droughtiness is a limitation. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces help to prevent excessive soil losses. Winter cover crops and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

64C2—Parr fine sandy loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable fine sandy loam about 6 inches thick. The subsoil is about 23 inches thick. It is friable. The upper part is dark yellowish brown loam. The lower part is dark brown clay loam. The substratum to a depth of 60 inches is brown, friable, mildly alkaline loam. In some places the surface layer and the subsoil are thinner. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the excessively drained Sparta soils. These soils are in the slightly higher dunal areas. They contain more sand in the subsoil and substratum than the Parr soil. They make up 3 to 10 percent of the unit.

Water and air move through the Parr soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is neutral. Root growth is somewhat limited by the massive loam glacial till below a depth of about 29 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture and to dwellings with basements. It is moderately suited to septic tank absorption fields, dwellings without basements, and local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing and water erosion are hazards. Also, droughtiness is a limitation. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes grasses and legumes help to prevent excessive soil losses. Winter cover crops and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

67—Harpster silty clay loam. This nearly level, poorly drained soil is on outwash plains and lakebeds. It is ponded for brief periods from March to June. Individual areas are irregular in shape and range from 5 to 1,500 acres in size.

Typically, the surface layer is black, friable, calcareous silty clay loam about 9 inches thick. The subsurface layer is very dark gray, friable, calcareous silty clay loam about 4 inches thick. The subsoil is about 29 inches thick. It is mottled, friable, and calcareous. The upper part is grayish brown silty clay loam. The next part is olive gray and gray silty clay loam. The lower part is gray silt loam. The substratum to a depth of 60 inches is gray, mottled, friable, calcareous silt loam. In some places more sand is throughout the profile. In other places the depth to carbonates is more than 15 inches. In a few places the substratum has sandy or gravelly layers.

Included with this soil in mapping are small areas of the Drummer and Elburn soils that have a gravelly substratum and small areas of other Drummer and Elburn soils. Drummer soils are in positions on the landscape similar to those of the Harpster soil. The somewhat poorly drained Elburn soils are in the slightly higher landscape positions. Included soils do not have carbonates in the subsoil. They make up 2 to 10 percent of the unit.

Water and air move through the Harpster soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. Reaction is mildly alkaline or moderately alkaline throughout the profile. The surface layer is friable but becomes hard and cloddy if tilled when wet. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to septic tank absorption fields and dwellings because of the seasonal high water table and the frequent ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. Additional drainage may be needed. Subsurface drains and ditches remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth. The high content of lime decreases the availability of applied phosphorus and potassium. As a result, additional applications of phosphorus and potassium may be needed.

The seasonal high water table, low strength, and frost action are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

68—Sable silty clay loam. This nearly level, poorly drained soil is in drainageways and depressions on uplands. It is ponded for brief periods from March to June. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 5 inches thick. The subsoil is mottled, friable silty clay loam about 39 inches thick. The upper part is dark gray, and the lower part is olive gray. The substratum to a depth of 60 inches is olive gray, mottled, friable, mildly alkaline silt loam. In a few places the lower part of the subsoil and the substratum contain more sand. In places the depth to a seasonal high water table is more than 2 feet. In a few areas the soil is calcareous.

Included with this soil in mapping are small areas of the moderately well drained Tama soils. These soils are in the higher landscape positions. Also included are some areas that are ponded throughout most of the growing season. Included areas make up 2 to 10 percent of the unit.

Water and air move through the Sable soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. The subsoil is slightly acid or neutral. The surface layer is friable but becomes hard and cloddy if tilled when wet. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to septic tank absorption fields and dwellings because of the seasonal high water table and the frequent ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains and ditches remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, low strength, and frost action are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

68+—Sable silt loam, overwash. This nearly level, poorly drained soil is in depressions on uplands. It is ponded for brief periods from March to June. Individual areas are irregular in shape and range from 4 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 14 inches thick. The subsurface layer is black and very dark gray, friable silty clay loam about 24 inches thick. The subsoil to a depth of 60 inches is mottled, friable silty clay loam. The upper part is dark gray, and the lower part is gray. In some places the silt loam overwash is more than 20 inches thick. In other places it does not occur. In some areas the lower

part of the subsoil contains more sand. In a few places the depth to a seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of the moderately well drained Catlin and Saybrook soils. These soils are in the more sloping areas. Also included are a few areas that are ponded throughout most of the growing season. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Sable soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to septic tank absorption fields and dwellings because of the seasonal high water table and the frequent ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains and ditches remove excess water.

The seasonal high water table, low strength, and frost action are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

69—Milford silty clay loam. This nearly level, poorly drained soil is in depressions on glacial lake plains. It is occasionally flooded or ponded for brief periods from April to June. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is black, firm silty clay loam about 10 inches thick. The subsurface layer is about 13 inches thick. The upper part is black, firm silty clay, and the lower part is very dark gray, mottled, firm silty clay loam. The subsoil is about 26 inches thick. It is mottled and firm. It is dark gray silty clay loam in the upper part, dark gray silty clay in the next part, and gray silty clay in the lower part. The substratum to a depth of 60 inches is gray, mottled, firm silty clay. It has a few thin strata of sandy loam. In places the surface layer and subsoil contain less clay and more sand.

Included with this soil in mapping are small areas of the calcareous Canisteo soils and the very poorly drained Gilford soils, which have a surface layer of fine sandy loam. Both of these included soils are on the slightly higher parts of the landscape. Also included are some areas that are ponded throughout most of the growing season. Included areas make up 2 to 10 percent of the unit.

Water and air move through the Milford soil at a moderately slow rate. Surface runoff is ponded to slow in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is neutral. The surface layer is friable but becomes hard and cloddy if tilled when wet. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to septic tank absorption fields and dwellings because of the seasonal high water table, the occasional flooding, and the moderately slow permeability.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains and ditches remove excess water. Tile drains function slowly because of the moderately slow permeability. Scattered surface drains may be needed. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, low strength, and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

73—Ross silt loam. This nearly level, well drained soil is on low stream terraces and flood plains. It is subject to rare flooding for brief periods from March to June. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is black, friable silt loam about 10 inches thick. The subsurface layer is black, friable silt loam about 13 inches thick. The subsoil is about 32 inches thick. It is friable. The upper part is very dark gray silt loam. The next part is very dark grayish brown silt loam. The lower part is dark brown loam. The substratum to a depth of 60 inches is dark yellowish brown, very friable sandy loam. In places the soil contains more sand throughout.

Included with this soil in mapping are small areas of Lawson and Waukee soils. The somewhat poorly drained Lawson soils are in abandoned stream channels. Waukee soils are in the higher terrace positions, which are not subject to flooding. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Ross soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 5.0 to 6.0 feet below the surface during the spring. Available water capacity is

high. Organic matter content also is high. The subsoil is neutral. The potential for frost action is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to septic tank absorption fields but is unsuited to dwellings because of the hazard of flooding. It is moderately suited to local roads and streets.

This soil has few limitations when used for corn, soybeans, and small grain. Returning crop residue to the soil or adding other organic material helps to maintain fertility and increases the rate of water infiltration.

Frost action, flooding, and low strength are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is I.

76—Otter silt loam. This nearly level, poorly drained soil is on flood plains. It is occasionally flooded or ponded for brief periods from April to June. Individual areas are long and narrow and range from 5 to 40 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is very dark gray, mottled, friable silt loam about 20 inches thick. The substratum to a depth of 60 inches is very dark gray, mottled, friable silt loam. In some places the depth to a seasonal high water table is more than 2 feet. In other places the subsurface layer contains more sand. In some areas the substratum contains more sand. In a few places the surface soil and the substratum contain more clay.

Included with this soil in mapping are small areas that are ponded for long periods throughout the growing season. These areas make up 5 to 10 percent of the unit.

Water and air move through the Otter soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. The surface layer and subsurface layer are neutral. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is unsuited to septic tank absorption fields and dwellings because of the seasonal high water table and the occasional flooding. It is poorly suited to local roads and streets.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains and ditches remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, low strength, and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

82—Millington silty clay loam. This nearly level, poorly drained soil is on the flood plains along the Rock River. It is frequently flooded for brief periods from April to June. Individual areas are long and narrow and range from 5 to 50 acres in size.

Typically, the surface layer is black, friable, mildly alkaline silty clay loam about 12 inches thick. The subsoil is about 34 inches thick. It is friable and mildly alkaline. The upper part is black silty clay loam. The next part is black clay loam. The lower part is black loam. The substratum to a depth of 60 inches is very dark gray, very friable, mildly alkaline loam and sandy loam. In places more sand is in the substratum.

Included with this soil in mapping are small areas of the moderately well drained Du Page, somewhat poorly drained Lawson, and well drained Ross soils. These soils are in the higher landscape positions. They make up 2 to 10 percent of the unit.

Water and air move through the Millington soil at a moderate rate. Surface runoff is slow. A seasonal high water table is within a depth of 2.0 feet during the spring. Available water capacity is high. Organic matter content also is high. Reaction is mildly alkaline throughout the profile. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are wooded. This soil is well suited to woodland wildlife habitat. It is moderately suited to woodland. It is unsuited to cultivated crops and to septic tank absorption fields, dwellings, and local roads and streets because of the seasonal high water table and the frequent flooding.

In the areas used for woodland, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Harvesting methods that do not isolate the remaining trees or leave them widely spaced help to prevent windthrow. Plant competition can be controlled by applying chemicals.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Wildlife food plots and additional wildlife cover can be easily established. The habitat should be protected from fire and grazing.

The land capability classification is Vw.

87A—Dickinson sandy loam, 0 to 3 percent slopes. This nearly level, somewhat excessively drained soil is on low dunes. Individual areas are irregular in shape and range from 5 to 70 acres in size.

Typically, the surface layer is very dark grayish brown, friable sandy loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable sandy loam about 9 inches thick. The subsoil is about 31 inches thick. The upper part is dark yellowish brown, friable sandy loam. The lower part is dark yellowish brown and brown, very friable loamy sand. The substratum to a depth of 60 inches is yellowish brown, mottled, loose sand. In some places the dark surface soil is less than 10 inches thick. In other places the surface soil and the subsoil contain more sand. In a few places the subsoil contains more clay.

Included with this soil in mapping are small areas of the very poorly drained Gilford, somewhat poorly drained Hoopeston, and poorly drained Selma soils. Gilford and Selma soils are in the lower areas. Hoopeston soils are slightly lower on the landscape than the Dickinson soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Dickinson soil at a moderately rapid rate and through the lower part of the subsoil and the substratum at a rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is low. Organic matter content is moderately low. The subsoil is slightly acid and medium acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to septic tank absorption fields. It is well suited to dwellings and moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, winter cover crops, and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIs.

87B—Dickinson sandy loam, 3 to 7 percent slopes. This gently sloping, somewhat excessively drained soil is on dunes. Individual areas are irregular in shape and range from 4 to 10 acres in size.

Typically, the surface layer is very dark grayish brown, very friable sandy loam about 8 inches thick. The subsurface layer is very dark grayish brown, very friable sandy loam about 5 inches thick. The subsoil is about 18 inches thick. It is very friable. The upper part is dark brown sandy loam. The next part is dark yellowish brown sandy loam. The lower part is dark yellowish brown loamy sand. The substratum to a depth of 60 inches is loose sand. The upper part is dark yellowish brown, and the lower part is brown. In some places the surface layer is thinner. In other places the surface soil and the subsoil contain more sand. In a few places the subsoil contains more clay.

Included with this soil in mapping are small areas of the very poorly drained Gilford, somewhat poorly drained Hoopeston, and poorly drained Selma soils. These soils are in shallow depressions and drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Dickinson soil at a moderately rapid rate and through the lower part of the subsoil and the substratum at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is low. Organic matter content is moderately low. The subsoil is strongly acid to slightly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to septic tank absorption fields. It is well suited to dwellings and moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing, water erosion, and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and zero tillage help to prevent excessive soil losses. Winter cover crops and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIIe.

88B2—Sparta loamy sand, 1 to 7 percent slopes, eroded. This gently sloping, excessively drained soil is on dunes. Individual areas are long and narrow, crescent shaped, or irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, very friable loamy sand about 8 inches thick. The subsoil is about 26 inches thick. It is dark yellowish brown and very friable. The upper part is loamy sand. The lower part is sand. The

substratum to a depth of 60 inches is yellowish brown, loose sand. In some places the surface layer is lighter colored. In other places the subsoil contains less sand. In a few places the surface layer is thicker. In some areas a subsoil consisting of reddish bands is within a depth of 60 inches.

Included with this soil in mapping are small areas of the poorly drained Orio and somewhat poorly drained Hoopeston soils. These soils are in shallow depressions and broad low areas. They make up 2 to 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is low. Organic matter content is moderately low. The subsoil is medium acid and strongly acid.

Most areas are cultivated. This soil is poorly suited to cultivated crops, hay, and pasture and to septic tank absorption fields. It is moderately suited to recreational development and well suited to dwellings and local roads and streets. It is a probable source of sand.

In areas used for corn, soybeans, and small grain, soil blowing and drought are hazards. Contour farming and a system of conservation tillage that leaves crop residue on the surface after planting help to control soil blowing and conserve moisture. Winter cover crops and field windbreaks also help to control soil blowing. Irrigation commonly supplies additional water.

In areas used for hay and pasture, erosion and soil blowing are hazards, particularly during periods when the plants are being established. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion. Planting drought-resistant grasses and legumes helps to maintain a plant cover. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if sealed sand filter and disinfection tank are installed.

The land capability classification is IVs.

88D2—Sparta loamy sand, 7 to 20 percent slopes, eroded. This sloping to moderately steep, excessively drained soil is on dunes. Individual areas are long and narrow, crescent shaped, or irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is very dark brown, very friable loamy sand about 6 inches thick. The subsoil is very friable sand about 24 inches thick. The upper part is brown, and the lower part is strong brown. The substratum to a depth of 60 inches is strong brown, loose sand. In some places the surface layer is lighter colored. In other places a subsoil consisting of reddish bands is within a depth of 60 inches.

Included with this soil in mapping are small areas of the poorly drained Orio and somewhat poorly drained Hoopeston soils. These soils are in shallow depressions and broad low areas. They make up 2 to 10 percent of the unit.

Water and air move through the Sparta soil at a rapid rate. Surface runoff is slow. Available water capacity is low. Organic matter content is moderately low. The subsoil is slightly acid.

Most areas are used for pasture. This soil is unsuited to cultivated crops. It is poorly suited to hay and pasture and to septic tank absorption fields. It is moderately suited to dwellings, local roads and streets, and recreational development. It is a probable source of sand.

In areas used for hay and pasture, soil blowing, water erosion, and drought are hazards, particularly during periods when the plants are being established. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control soil blowing and water erosion. Planting drought-resistant grasses and legumes helps to establish a plant cover. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The slope is a limitation if this soil is used as a site for dwellings or local roads and streets. Alteration of the slope by cutting and filling, however, helps to overcome this limitation.

The land capability classification is VIIs.

93E—Rodman gravelly sandy loam, 12 to 20 percent slopes. This moderately steep, excessively drained soil is on kames, eskers, and stream terrace breaks. Individual areas are elongated or oval and range from 3 to 40 acres in size.

Typically, the surface layer is very dark grayish brown gravelly sandy loam about 7 inches thick. The subsoil is dark brown, very friable gravelly sandy loam about 8 inches thick. The substratum to a depth of 60 inches is yellowish brown, mildly alkaline, stratified gravelly loamy sand and sand. In some places, the surface soil is lighter colored or the subsoil is thicker or both. In other places the slope is less than 12 or more than 20 percent. In a few places the substratum has layers of calcareous sandy loam.

Included with this soil in mapping are small areas where limestone or sandstone bedrock is below the subsoil. These areas make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Rodman soil at a moderately rapid rate and through the substratum at a very rapid rate. Surface runoff is slow.

Available water capacity is very low. Organic matter content is moderate. The subsoil is mildly alkaline.

Most areas are pastured. This soil is poorly suited to pasture, to openland wildlife habitat, and to septic tank absorption fields, dwellings, and local roads and streets.

In areas used for pasture, erosion and drought are hazards. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion. Planting drought-resistant grasses and legumes helps to establish a plant cover.

If this soil is used for openland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The slope is a limitation if this soil is used as a site for dwellings, sanitary facilities, or local roads and streets. Alteration of the slope by cutting and filling, however, helps to overcome this limitation.

The land capability classification is VIs.

102—La Hogue loam. This nearly level, somewhat poorly drained soil is on broad low areas on outwash plains. Individual areas are irregular in shape and range from 5 to 120 acres in size.

Typically, the surface layer is black, friable loam about 11 inches thick. The subsurface layer is very dark gray, friable loam about 7 inches thick. The subsoil is about 23 inches thick. The upper part is very dark grayish brown, friable loam. The next part is brown, mottled, friable loam and grayish brown, mottled, friable silty clay loam and clay loam. The lower part is grayish brown, mottled, very friable sandy loam. The substratum to a depth of 60 inches is mottled strong brown, light brownish gray, brown, and yellowish brown, loose, stratified loamy sand and sand. In places the subsoil contains more sand. In a few places it contains less sand.

Included with this soil in mapping are small areas of the very poorly drained Gilford, well drained Jasper and Waukee, and poorly drained Selma soils. Jasper and Waukee soils are in the higher landscape positions. Gilford and Selma soils are in the lower landscape positions. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the La Hogue soil at a moderate rate and through the substratum at a moderately rapid rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid to very strongly acid. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to septic tank absorption fields, dwellings with basements, and local roads and streets. It is moderately suited to dwellings without basements.

In areas used for corn, soybeans, and small grain, additional drainage may be needed. Enclosing subsurface drainage conduits with filters or envelope material helps to prevent the accumulation of sand in the conduit.

The seasonal high water table is a limitation if this soil is used as a septic tank absorption field. Elevating the absorption field with suitable fill material and installing perimeter drains help to overcome the wetness.

The wetness and the shrink-swell potential are limitations if this soil is used as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains around foundations help to remove excess water from around basement walls and floors. Enclosing subsurface drainage conduits with filters or envelope material helps to prevent the accumulation of sand in the conduit. Frost action, low strength, and wetness are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by frost action and low strength. Open ditches help to remove the excess water.

The land capability classification is I.

103—Houghton muck. This nearly level, very poorly drained soil is in depressions on outwash plains and till plains. It is ponded for brief periods from September to June. Individual areas are oval and range from 3 to 80 acres in size.

Typically, this soil is black muck to a depth of 60 inches. The upper part is very friable, and the lower part is friable. Some partially decomposed plant material is throughout the soil. In some places the surface layer is silt loam. In other places the soil has a sandy substratum.

Included with this soil in mapping are small areas of the poorly drained Comfrey and Sable soils. These soils are in the slightly higher landscape positions. Also included are small areas that are ponded throughout most of the growing season. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Houghton soil at a moderately slow to moderately rapid rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 1.0 foot above the surface to 1.0 foot below during the spring. Available water capacity is very high. Organic matter content also is very high. The soil is neutral throughout. The potential for frost action is high.

The rate of subsidence in drained and cultivated areas is about 1 foot in 10 years because of accelerated decomposition.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is unsuited to dwellings, septic tank absorption fields, and local roads and streets because of low strength and the ponding.

In areas used for corn, soybeans, and small grain, the ponding is a hazard. Soil blowing is also a hazard. The cultivated areas have been drained, but additional drainage may be needed. Measures that maintain the subsurface drains and ditches also are needed. Leaving crop residue on the surface helps to prevent excessive soil loss.

The land capability classification is IIIw.

125—Selma loam. This nearly level, poorly drained soil is in broad depressions and narrow drainageways on outwash plains and lake plains. It is occasionally flooded or ponded for brief periods from April to June (fig. 5). Individual areas are irregular in shape and range from 5 to 600 acres in size.

Typically, the surface layer is black, friable loam about 7 inches thick. The subsurface layer is very dark gray, friable loam about 11 inches thick. The subsoil is about 35 inches thick. The upper part is dark gray, friable loam. The next part is olive gray, mottled, friable silt loam. The lower part is olive gray, very friable sandy loam. The substratum to a depth of 60 inches is olive gray, mottled, very friable, stratified sandy loam and loamy sand. It contains some gravel. In places the lower part of the subsoil and the substratum contain more clay. In a few places the surface layer and the subsoil contain more clay. In some areas the soil contains less clay. In other areas the dark surface layer is more than 24 inches thick.

Included with this soil in mapping are small areas of Canisteo and Hoopeston soils. Canisteo soils are in positions on the landscape similar to those of the Selma soil. They are calcareous throughout. The somewhat

Figure 5.—Flood-damaged corn in an area of Selma loam.

poorly drained Hoopeston soils are on the slightly higher parts of the landscape. They contain more sand in the surface soil and the subsoil than the Selma soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Selma soil at a moderate rate and through the substratum at a moderately rapid rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is neutral and mildly alkaline. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the seasonal high water table and the occasional flooding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains and ditches help to remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, low strength, and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

145B2—Saybrook silt loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on till plains. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is mixed very dark gray and dark yellowish brown, friable silt loam about 8 inches thick. The subsoil is about 25 inches thick. The upper part is brown, friable silty clay loam. The next part is dark yellowish brown, mottled, friable silty clay loam and firm clay loam. The lower part is brown, mottled, friable loam. The substratum to a depth of 60 inches is brown, mottled, friable, moderately alkaline loam. In some places the subsoil contains more sand. In other places the soil is deeper to calcareous material. In a few places the surface layer is thicker.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Flanagan soils. These soils are in shallow depressions and along drainageways. They make up 5 to 15 percent of the unit.

Water and air move through the Saybrook soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. Root growth is somewhat limited by the massive loamy glacial till below a depth of about 33 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields. It is poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

The seasonal high water table and the restricted permeability are limitations if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water. Enlarging the absorption field helps to overcome the restricted permeability.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with basements. Subsurface drains help to remove excess water from around walls and floors. The shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

145C2—Saybrook silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on convex slopes on moraines. Individual areas are irregular in shape and range from 5 to 25 acres in size.

Typically, the surface layer is mixed very dark gray and brown, friable silt loam about 8 inches thick. The subsoil is about 27 inches thick. It is friable. The upper part is brown silt loam and brown silty clay loam. The next part is yellowish brown, mottled silty clay loam. The lower part is dark yellowish brown, mottled clay loam. The substratum to a depth of 60 inches is pale brown, mottled, friable, moderately alkaline loam. In some areas more sand is in the subsoil. In some places the substratum is closer to the surface. In other places the soil is deeper to calcareous material.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Flanagan soils. These soils are in shallow depressions and drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the Saybrook soil at a moderate rate. Surface runoff is rapid in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid and neutral. Root growth is somewhat limited by the massive loamy glacial till below a depth of

about 35 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings and septic tank absorption fields. It is poorly suited to local roads and streets. It is well suited to hay and pasture.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses.

The seasonal high water table and the restricted permeability are limitations if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water. Enlarging the absorption field helps to overcome the restricted permeability.

The seasonal high water table is a limitation if this soil is used as a site for dwellings with basements. Subsurface drains around basement foundations help to remove excess water. The shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

152—Drummer silty clay loam. This nearly level, poorly drained soil is in low areas on outwash plains and glacial till plains. It is ponded for brief periods from March to June. Individual areas are irregular in shape and range from 20 to 1,000 acres in size.

Typically, the surface layer is black, friable silty clay loam about 10 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 6 inches thick. The subsoil extends to a depth of 60 inches. It is mottled and friable. The upper part is gray silty clay loam. The next part is olive gray silty clay loam. The lower part is olive gray loam and sandy clay loam. In some places gravel is in the substratum. In other places the loamy material does not occur within a depth of 60 inches. In a few places the surface layer and the subsoil contain more sand. In some areas the surface layer is silt loam. In a few areas the depth to a seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of Harpster soils and a few areas along drainage ditches that are occasionally flooded. Harpster soils are in positions on the landscape similar to those of the Drummer soil. They have a calcareous surface layer and subsoil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Drummer soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. The subsoil is neutral. The surface layer is friable but becomes hard and cloddy if tilled when wet. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain, but ponding is a hazard. Measures that maintain the drainage system are needed. Subsurface drains and ditches remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, low strength, and frost action are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

154A—Flanagan silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on the lower slopes on glacial till plains. Individual areas are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface layer is black, friable silt loam about 8 inches thick. The subsurface layer is black, friable silt loam about 6 inches thick. The subsoil is about 42 inches thick. It is friable. The upper part is brown silty clay loam. The next part is yellowish brown and brown, mottled silty clay loam. The lower part is dark yellowish brown, mottled clay loam. The substratum to a depth of 60 inches is light yellowish brown, mottled, friable, mildly alkaline loam. In places the lower part of the subsoil is silt loam and contains no pebbles. In a few places it is sandy loam. In some areas the depth to a seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Drummer and well drained Parr soils. Parr soils are in the slightly higher, more sloping areas. Drummer soils are in the slightly lower landscape positions. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Flanagan soil at a moderate rate and through the lower part at a moderately slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is slightly acid and neutral. The shrink-swell potential and the potential for frost action are high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to septic tank absorption fields, dwellings, and local roads and streets.

In areas used for corn, soybeans, and small grain, a drainage system may be needed in years of above normal rainfall. Subsurface drains function well if suitable outlets are available. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

If this soil is used as a septic tank absorption field, the seasonal high water table and the restricted permeability are limitations. Underground drains help to lower the water table. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

If this soil is used as a site for dwellings, the seasonal high water table and the shrink-swell potential are limitations. Installing underground drains helps to lower the water table. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Installing a drainage system helps to establish lawns and ornamental trees and shrubs. Low strength, frost action, and the shrink-swell potential are limitations on sites for local roads and streets. Providing suitable subgrade material helps to prevent the damage resulting from low strength and from shrinking and swelling. Installing a drainage system and then grading the roads so that they shed water reduce wetness and thus help to prevent the damage caused by frost action.

The land capability classification is I.

171B—Catlin silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on glacial till plains. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 45 inches thick. It is friable. The upper part is dark brown silty clay loam. The next part is brown and yellowish brown, mottled silty clay loam and silt loam. The lower part is yellowish brown, mottled, mildly alkaline loam. The substratum to a depth of 60 inches is yellowish brown, mottled, friable, mildly alkaline loam. In some places the soil is not so deep to calcareous loamy material. In other places less sand is in the lower part of the subsoil and the substratum. In some areas the surface layer is thinner. In a few places the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in shallow depressions and drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the Catlin soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid in the upper part and mildly alkaline in the lower part. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields. It is poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

The seasonal high water table and the restricted permeability are limitations if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water. Enlarging the absorption field helps to overcome the restricted permeability.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Subsurface drains around basement foundations help to remove excess water. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

171C2—Catlin silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on convex slopes on glacial till plains. Individual areas are irregular in shape and range from 5 to 35 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 6 inches thick. The subsoil is about 51 inches thick. The upper part is dark yellowish brown, friable silty clay loam. The next part is yellowish brown, mottled, friable silty clay loam and silt loam. The lower part is yellowish brown, mottled, firm clay loam. The substratum to the depth of 60 inches is brown, mottled, firm, mildly alkaline clay loam. In some places the soil is not so deep to calcareous loamy material. In other places less sand is in the lower part of the subsoil and the substratum. In a few places the subsoil contains more sand.

Included with this soil in mapping are small areas of Assumption and Lawson soils. Assumption soils have a gray clay loam buried soil within a depth of 40 inches. They are in positions on the landscape similar to those of the Catlin soil. The somewhat poorly drained Lawson soils are in drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Catlin soil at a moderate rate. Surface runoff is rapid in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is

slightly acid in the upper part and mildly alkaline in the lower part. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings and septic tank absorption fields. It is well suited to hay and pasture and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses.

The seasonal high water table and the restricted permeability are limitations if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water. Enlarging the absorption field helps to overcome the restricted permeability.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Subsurface drains around basement foundations help to remove excess water. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

172—Hoopeston fine sandy loam. This nearly level, somewhat poorly drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is black, very friable fine sandy loam about 10 inches thick. The subsurface layer is very dark grayish brown, very friable fine sandy loam about 8 inches thick. The subsoil is mottled, friable fine sandy loam about 14 inches thick. The upper part is yellowish brown. The lower part is light brownish gray. The substratum to a depth of 60 inches is pale brown, loose sand. In some places the subsoil contains more sand. In other places it contains more clay. In a few places the thickness of the surface layer combined with that of the subsurface layer is less than 10 inches.

Included with this soil in mapping are small areas of the somewhat excessively drained Dickinson, very poorly drained Gilford, poorly drained Selma, and excessively drained Sparta soils. Dickinson and Sparta soils are in the higher landscape positions. They are more droughty than the Hoopeston soil. Selma and Gilford soils are in the slightly lower landscape positions and are occasionally flooded. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Hoopeston soil at a moderately rapid rate and through the substratum at a rapid rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is slightly acid. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to septic tank absorption fields, dwellings with basements, and local roads and streets. It is moderately suited to dwellings without basements.

In areas used for cultivated crops, soil blowing and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting helps to control soil blowing and conserves moisture. Cover crops and field windbreaks also help to control soil blowing. Excess water can generally be removed by a surface drainage system, but overdraining should be avoided because the soil is droughty. Enclosing subsurface drainage conduits with filters or envelope material helps to prevent the accumulation of sand in the conduit. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the seasonal high water table is a limitation. Also, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The wetness is a limitation if this soil is used as a site for dwellings. Subsurface drains remove excess water from around basement walls and floors. Enclosing subsurface drainage conduits with filters or envelope material helps to prevent the accumulation of sand in the conduit. Frost action and wetness are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by frost action. Open ditches help to remove the excess water.

The land capability classification is IIs.

198—Elburn silt loam. This nearly level, somewhat poorly drained soil is in broad areas on glacial till plains and outwash plains. Individual areas are irregular in shape and range from 5 to 100 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 40 inches thick. It is mottled and friable. The upper part is dark grayish brown silty clay loam. The next part is grayish brown silty clay loam. The lower part is grayish brown loam. The substratum to a depth of 60 inches is grayish brown, mottled, friable, stratified sandy loam, sandy clay loam, and clay loam. In some places the lower part of the subsoil and the substratum are silt loam. In other places the substratum is mildly alkaline loam. In a few places the middle part of

the subsoil contains more sand. In some areas the depth to a seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in the slightly lower areas. They make up 5 to 10 percent of the unit.

Water and air move through the Elburn soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is medium acid to neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings without basements and poorly suited to dwellings with basements and to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, a drainage system may be needed. Subsurface drains function well if suitable outlets are available. Keeping tillage at a minimum and returning crop residue to the soil help to maintain tilth and fertility.

The seasonal high water table is a limitation if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water.

The seasonal high water table is a limitation if this soil is used as a site for dwellings. Subsurface drains around basement foundations help to remove excess water. The shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Frost action, low strength, and wetness are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by frost action and low strength. Open ditches help to remove the excess water.

The land capability classification is I.

199A—Plano silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on outwash plains. Individual areas are irregular in shape and range from 3 to 70 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches. It is friable. The upper part is dark yellowish brown silty clay loam. The next part is yellowish brown silty clay loam and dark yellowish brown, mottled silty clay loam. The lower part is dark yellowish brown, mottled silt loam and yellowish brown, stratified silt loam, loam, and sandy loam. In places the lower part of the subsoil is not stratified and is silt loam. In a few places it is mildly alkaline loam. In some areas the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in shallow depressions and broad low areas. They make up 5 to 10 percent of the unit.

Water and air move through the Plano soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid and neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields. It is poorly suited to local roads and streets.

This soil has few limitations when used for corn, soybeans, and small grain. Returning crop residue to the soil or adding other organic material helps to maintain fertility and increases the rate of water infiltration.

If this soil is used as a septic tank absorption field, the seasonal high water table and the restricted permeability are limitations. Subsurface drains remove excess water. Installing the distribution lines closer to the surface than is typical also helps to overcome the wetness. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. It can be lowered, however, by installing tile lines around the base of foundations. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Low strength and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is I.

199B—Plano silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark brown, friable silty clay loam. The next part is dark brown, mottled, friable silty clay loam; brown, mottled, friable silt loam; and light grayish brown, mottled, very friable silt loam. The lower part is brown, mottled, friable, stratified silt loam, loam, and sandy loam. In places the surface layer is thinner. In some places the soil is not so deep to stratified textures. In other places the lower part of the subsoil is not stratified and is silt loam. In a few places it is mildly alkaline loam. In a few areas the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Drummer soils. These soils are in

shallow depressions and drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the Plano soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid and neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields. It is poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, and by terraces.

If this soil is used as a septic tank absorption field, the seasonal high water table and the restricted permeability are limitations. Subsurface drains remove excess water. Installing the distribution lines closer to the surface than is typical also helps to overcome the wetness. Enlarging the absorption area helps to overcome the slow absorption of liquid waste.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Also, the seasonal high water table is a limitation on sites for dwellings with basements. It can be lowered, however, by installing tile lines around the base of foundations. Reinforcing the foundations helps to prevent the structural damage caused by shrinking and swelling. Low strength and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

199C2—Plano silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark yellowish brown and yellowish brown, friable silty clay loam. The next part is yellowish brown, friable silt loam and loam. The lower part is yellowish brown, very friable sandy loam. In some places less sand is in the lower part of the subsoil. In other places the substratum is mildly alkaline loam.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Elburn soils. These soils are in shallow depressions and drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the Plano soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to hay and pasture and to septic tank absorption fields. It is moderately suited to cultivated crops and to dwellings. It is poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes.

If this soil is used as a site for dwellings, the shrink-swell potential is a limitation. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Low strength and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

200—Orio sandy loam. This nearly level, poorly drained soil is in depressions adjacent to sand dunes. It is ponded for brief periods from April to July. Individual areas are oval or irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is black, friable sandy loam about 11 inches thick. The subsurface layer is friable sandy loam about 10 inches thick. The upper part is dark grayish brown. The lower part is gray and mottled. The subsoil is about 26 inches thick. The upper part is dark gray, mottled, friable sandy clay loam. The next part is dark gray, mottled, very friable sandy loam. The lower part is gray, mottled, very friable loamy sand. The substratum to a depth of 60 inches is dark grayish brown, mottled, loose sand. In some places the surface layer is thinner. In other places the subsoil is thinner. In a few places it contains more sand and less clay.

Included with this soil in mapping are small areas that are ponded during most of the growing season. These areas make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Orio soil at a moderately slow rate and through the substratum at a rapid rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 1.0 foot below during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is strongly acid. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is poorly suited to local

roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. It is drained by a combination of subsurface drains and surface inlets or ditches. Measures that maintain the drainage system are needed. Enclosing subsurface drainage conduits with filters or envelope material helps to prevent the accumulation of sand in the conduit. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, low strength, and frost action are limitations if this soil is used as a site for local roads and streets. These limitations can be overcome by providing open ditches, which remove excess water, by strengthening or replacing the base material, and by raising the roadbed with fill material.

The land capability classification is IIw.

201—Gilford fine sandy loam. This nearly level, very poorly drained soil is on outwash plains. It is occasionally flooded or ponded for brief periods from March to June. Individual areas are irregular in shape and range from 10 to 2,000 acres in size.

Typically, the surface layer is black, friable fine sandy loam about 10 inches thick. The subsurface layer is very dark gray, mottled, friable fine sandy loam about 13 inches thick. The subsoil is dark gray, mottled, very friable fine sandy loam about 17 inches thick. The substratum to a depth of about 60 inches is light brownish gray, loose sand. In some places the surface soil is more than 24 inches thick. In other places the soil contains more clay.

Included with this soil in mapping are small areas of the poorly drained Canisteo, somewhat poorly drained Hoopeston, and excessively drained Sparta soils. Hoopeston and Sparta soils are in the higher positions on the landscape. Canisteo soils are in positions on the landscape similar to those of the Gilford soil. They are calcareous. Also included are some areas in closed depressions, which are ponded for long periods. Included areas make up 5 to 10 percent of the unit.

Water and air move through the Gilford soil at a moderately rapid rate. Surface runoff is very slow or ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 1.0 foot below during the spring. Available water capacity is moderate. Organic matter content is high. The subsoil is slightly acid. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the occasional flooding and the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Enclosing subsurface drainage conduits with filters or envelope material helps to prevent the accumulation of sand in the conduit. Soil blowing and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, winter cover crops, and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water (fig. 6).

The seasonal high water table, low strength, frost action, and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

204B2—Ayr sandy loam, 1 to 7 percent slopes, eroded. This gently sloping, well drained soil is on till plains. Individual areas are irregular in shape and range from 4 to 30 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable sandy loam about 8 inches thick. The subsoil is about 31 inches thick. The upper part is dark yellowish brown, friable sandy loam. The lower part is dark brown, firm loam. The substratum to a depth of 60 inches is dark brown, firm, mildly alkaline loam. In some places the subsoil contains less sand. In other places the surface layer is thicker.

Included with this soil in mapping are small areas of the somewhat poorly drained Odell and excessively drained Sparta soils. Odell soils are in shallow depressions and drainageways. Sparta soils are in the slightly higher landscape positions. They are more droughty than the Ayr soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Ayr soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is slightly acid and neutral. Root growth is somewhat limited by the massive, firm loam glacial till below a depth of about 39 inches. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to septic tank absorption fields and local roads and streets. It is well suited to dwellings.

In areas used for corn, soybeans, and small grain, soil blowing and water erosion are hazards. Also, the soil is droughty. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, or terraces help to prevent excessive soil losses. Winter cover crops and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

Figure 6.—Center-pivot irrigation in an area of Gilford fine sandy loam.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIe.

221B—Parr silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on till plains. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 26 inches thick. It is friable. The upper part is dark brown silty clay loam. The next part is brown clay loam. The lower part is dark yellowish brown, mildly alkaline loam. In some places the subsoil contains more clay or less sand, or both. In other places the surface layer is thinner. In some areas the subsoil is thinner.

Included with this soil in mapping are small areas of the somewhat poorly drained Odell soils. These soils are on the lower slopes. They make up 5 to 10 percent of the unit.

Water and air move through the Parr soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content also is high. The subsoil is medium acid or slightly acid. Root growth is somewhat limited by the massive loam glacial till below a depth of about 38

inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture and to dwellings with basements. It is moderately suited to septic tank absorption fields, dwellings without basements, and local roads and streets.

Erosion is a hazard in the areas used for corn, soybeans, or small grain. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

221B2—Parr silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained soil is on till plains. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 7 inches thick. The subsoil is friable clay loam about 20 inches thick. The upper part is dark yellowish brown, and the lower part is dark brown. The substratum to a depth of 60 inches is brown, friable, mildly alkaline loam. In some places the subsoil is thinner. In a few places the surface layer is lighter colored. In other places it is thicker. In a few areas less sand is in the upper part of the subsoil.

Included with this soil in mapping are small areas of the somewhat poorly drained Flanagan and Odell soils. These soils are in drainageways downslope from the Parr soil. They make up 5 to 10 percent of the unit.

Water and air move through the Parr soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. Root growth is somewhat limited by the massive loamy glacial till below a depth of about 27 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture and to dwellings with basements. It is moderately suited to septic tank absorption fields, dwellings without basements, and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces. Returning crop residue to the soil and adding other organic material improve tilth and help to maintain the content of organic matter.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

221C2—Parr silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on till plains. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark brown, friable silt loam about 7 inches thick. The subsoil is friable clay loam about 18 inches thick. The upper part is brown, and the lower part is dark yellowish brown. The substratum to a depth of 60 inches is yellowish brown, friable, mildly alkaline loam. In some places, the subsoil is thinner and gravel is on the surface. In other places less sand is in the subsoil.

Included with this soil in mapping are small areas of the somewhat poorly drained Flanagan and Odell soils. These soils are on the lower slopes. They make up 2 to 8 percent of the unit.

Water and air move through the Parr soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid and slightly acid. Root growth is somewhat limited by the massive loamy glacial till below a depth of about 25 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay and pasture and to dwellings with basements. It is moderately suited to septic tank absorption fields, dwellings without basements, and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of

small grain, and 2 years of grasses and legumes help to prevent excessive soil losses.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets.

The land capability classification is IIIe.

233B—Birkbeck silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on till plains. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is mixed dark grayish brown and dark brown, friable silt loam about 9 inches thick. The subsoil is about 35 inches thick. It is friable. The upper part is dark brown silty clay loam. The next part is yellowish brown, mottled silty clay loam. The lower part is dark brown, mottled clay loam. The substratum to a depth of 60 inches is dark brown, mottled, firm, mildly alkaline loam. In some places the depth to the loamy substratum is less than 40 inches. In other places the silty subsoil extends to a depth of more than 60 inches. In a few places the depth to a seasonal high water table is less than 3 feet.

Included with this soil in mapping are small areas of the well drained Whalan soils. These soils are on the steeper side slopes. They have bedrock at a depth of 20 to 40 inches. They make up 10 to 15 percent of the unit.

Water and air move through the Birkbeck soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 3.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The subsoil is medium acid and slightly acid. Root growth is somewhat limited by the massive, firm loamy glacial till below a depth of about 44 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, pasture, and woodland. It is moderately suited to dwellings. It is poorly suited to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

If this soil is used for woodland, plant competition is the main management concern. Initial competition can be controlled by proper site preparation. Subsequent competition can be controlled by spraying and cutting. If mechanical planters are used, planting on the contour helps to control erosion.

The restricted permeability in the subsoil and the seasonal high water table are limitations if this soil is used as a septic tank absorption field. Enlarging the absorption field helps to overcome the restricted permeability. Installing perimeter drains helps to remove excess water.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. The seasonal high water table also is a limitation on sites for dwellings with basements. Subsurface drains help to remove excess water from around basement walls and floors. The shrink-swell potential, frost action, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

233C2—Birkbeck silt loam, 5 to 10 percent slopes, eroded. This sloping, moderately well drained soil is on till plains. Individual areas are irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 44 inches thick. It is friable. The upper part is dark yellowish brown silty clay loam. The next part is dark yellowish brown, mottled silty clay loam. The lower part is dark yellowish brown, mottled clay loam. The substratum to a depth of 60 inches is yellowish brown, firm, mildly alkaline loam. In some places the loamy substratum is within a depth of 40 inches. In other places the silty subsoil extends to a depth of more than 60 inches. In a few places the surface layer is darker. In severely eroded areas the subsoil is exposed.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson and well drained Whalan soils and areas where the soil is gravelly or sandy at the surface. Lawson soils are in small drainageways. Whalan soils are on the lower side slopes. They have bedrock at a depth of 20 to 40 inches. Included areas make up 5 to 15 percent of the unit.

Water and air move through the Birkbeck soil at a moderate rate. Surface runoff is rapid in cultivated areas. A seasonal high water table is 3.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderately low. The subsoil is slightly acid and neutral. Root growth is somewhat limited by the massive loamy glacial till below a depth of about 51 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay, pasture, and woodland. It is moderately suited to dwellings and

poorly suited to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses.

If this soil is used for woodland, plant competition is the main management concern. Initial competition can be controlled by proper site preparation. Subsequent competition can be controlled by spraying and cutting. If mechanical planters are used, planting on the contour helps to control erosion.

The restricted permeability in the subsoil and the seasonal high water table are limitations if this soil is used as a septic tank absorption field. Enlarging the absorption field helps to overcome the restricted permeability. Installing perimeter drains helps to remove excess water.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. The seasonal high water table also is a limitation on sites for dwellings with basements. Subsurface drains help to remove excess water from around basement walls and floors. The shrink-swell potential, frost action, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

243A—St. Charles silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The subsoil extends to a depth of 60 inches. It is friable. The upper part is yellowish brown silt loam. The next part is yellowish brown silty clay loam and mottled silt loam. The lower part is yellowish brown, mottled, friable, stratified silt loam, sandy loam, and loam. In places the slope is more than 2 percent. In some areas the lower part of the subsoil contains more silt and less sand. In a few areas the surface layer is darker. In other areas the subsoil is sandier.

Included with this soil in mapping are small areas of somewhat poorly drained soils in the slightly lower positions on the landscape. These soils make up 5 to 10 percent of the unit.

Water and air move through the St. Charles soil at a moderate rate. Surface runoff is slow in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is medium acid to neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture and to septic tank absorption fields. It is moderately suited to dwellings. It is poorly suited to local roads and streets.

This soil has few limitations when used for corn, soybeans, and small grain. Returning crop residue to the soil or adding other organic material helps to maintain fertility and increases the rate of water infiltration.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. The shrink-swell potential, frost action, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is I.

243B—St. Charles silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is mixed dark grayish brown and yellowish brown, friable silt loam about 8 inches thick. The subsoil extends to a depth of about 60 inches. It is yellowish brown and friable. The upper part is silt loam and silty clay loam. The next part is mottled silt loam. The lower part is mottled, stratified silt loam, loam, and sandy loam. In some places the lower part of the subsoil contains more silt and less sand. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of Palsgrove and Whalan soils. These soils are more sloping than the St. Charles soil. They have bedrock within a depth of 60 inches. They make up 5 to 15 percent of the unit.

Water and air move through the St. Charles soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is slightly acid or neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture and to septic tank absorption fields. It is moderately suited to dwellings and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action, the shrink-swell

potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

244—Hartsburg silty clay loam. This nearly level, poorly drained soil is on lake plains. It is occasionally flooded or ponded for brief periods from April to June. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is black, friable silty clay loam about 12 inches thick. The subsurface layer is very dark gray, friable silty clay loam about 4 inches thick. The subsoil is about 32 inches thick. It is mottled, friable, and mildly alkaline. The upper part is dark gray silty clay loam. The lower part is olive gray silt loam. The substratum to a depth of 60 inches is olive gray, mottled, friable silt loam. In some places the depth to the mildly alkaline material is more than 40 inches. In other places the lower part of the subsoil and the substratum have strata containing more sand. In a few places the surface layer is calcareous.

Water and air move through this soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. The subsoil is mildly alkaline. The surface layer is friable but becomes hard and cloddy if tilled when wet. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the seasonal high water table and the flooding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains and ditches help to remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, flooding, low strength, and frost action are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

259C2—Assumption silt loam, 4 to 12 percent slopes, eroded. This sloping, moderately well drained soil is on side slopes on dissected till plains. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches. It is friable. The upper part is yellowish brown silt loam. The next part is yellowish brown and brown, mottled silty clay loam and gray and grayish brown, mottled clay loam. The lower part is yellowish brown, mottled clay loam. In some places the grayish clay loam subsoil layers are part of the plow layer. In other places the soil is deeper to clay loam or loam subsoil layers. In a few places the subsoil is thinner and is underlain by calcareous loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson soils. These soils are in narrow upland drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Assumption soil at a moderate rate and through the lower part of the subsoil at a moderately slow rate. Surface runoff is rapid in cultivated areas. A perched seasonal high water table is 3.0 to 4.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid and slightly acid. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings. It is poorly suited to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes help to prevent excessive soil losses. Side slope seepage is a limitation in the spring. Subsurface interceptor drains help to reduce the wetness.

The restricted permeability and the seasonal high water table are limitations if this soil is used as a septic tank absorption field. Enlarging the absorption field helps to overcome the restricted permeability. Subsurface drains help to remove excess water.

The shrink-swell potential and the slope are limitations if this soil is used as a site for dwellings. Also, the wetness is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling may be needed when sites for dwellings are prepared. Subsurface drains remove excess water from around basement walls and floors. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

280B—Fayette silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on uplands. Individual

areas are irregular in shape and range from 4 to 70 acres in size.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches. It is friable. The upper part is dark yellowish brown silt loam and silty clay loam. The next part is dark yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silt loam. In some places the surface layer is darker. In other places the lower part of the subsoil is mildly alkaline loam or silty clay loam.

Included with this soil in mapping are small areas of somewhat poorly drained soils and the moderately well drained Birkbeck soils. These soils are on the lower parts of the landscape. Birkbeck soils have a seasonal high water table 3.0 to 6.0 feet below the surface during the spring. Included soils make up 2 to 8 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is medium acid to neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture and to septic tank absorption fields. It is moderately suited to dwellings and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 4 to 30 acres in size.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable silt loam about 6 inches thick. The subsoil extends to a depth of 60 inches. It is friable. The upper part is dark yellowish brown silt loam and silty clay loam. The next part is dark yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silt loam. In places the lower part of the subsoil and the substratum contain more sand and are mildly alkaline.

Included with this soil in mapping are small areas of Birkbeck, Lawson, and Whalan soils. The moderately well drained Birkbeck soils have a seasonal high water table 3.0 to 6.0 feet below the surface during the spring. They are on the lower parts of the landscape. The somewhat poorly drained Lawson soils are in drainageways. Whalan soils are in positions on the landscape similar to those of the Fayette soil. They have limestone bedrock at a depth of 20 and 40 inches. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is strongly acid to neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay, pasture, and woodland. It is moderately suited to dwellings, well suited to septic tank absorption fields, and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses.

If this soil is used for woodland, excluding livestock and providing fire protection measures are the only management needs. Excluding livestock helps to prevent destruction of the leaf mulch, compaction of the soil, damage to tree roots, and the uprooting or eating of desirable young trees. Providing fire protection measures helps to prevent the killing or permanent injury of both young and old trees and the destruction of the leaf mulch.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action, the shrink-swell potential, and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

280D—Fayette silt loam, 10 to 15 percent slopes. This strongly sloping, well drained soil is on side slopes along upland drainageways. Individual areas are elongated and range from 5 to 25 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is friable silt loam about 6 inches thick. The upper part is very dark grayish brown and brown. The lower part is yellowish brown. The subsoil extends to a depth of 60 inches. It is yellowish brown and friable. The upper

part is silt loam and silty clay loam. The next part is mottled silty clay loam. The lower part is mottled silt loam. In places the lower part of the subsoil contains more sand and is mildly alkaline. In a few places the surface layer is eroded and is mixed with the upper part of the subsoil.

Included with this soil in mapping are small areas of Birkbeck, Lawson, and Whalan soils. The moderately well drained Birkbeck soils have a seasonal high water table at 3.0 to 6.0 feet below the surface during the spring. They are on the lower parts of the landscape. The somewhat poorly drained Lawson soils are in drainageways. Whalan soils are in positions on the landscape similar to those of the Fayette soils. They have limestone bedrock at a depth of 20 to 40 inches. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Fayette soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is slightly acid and medium acid. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are wooded. This soil is well suited to woodland. It is moderately suited to cultivated crops and to septic tank absorption fields and dwellings and poorly suited to local roads and streets.

In the areas used for woodland, planting seedlings on the contour and in an established cover crop helps to prevent excessive soil losses while the trees are being established. Plant competition can be controlled by harvesting mature trees, by cutting cull trees, and by thinning and weeding.

In areas used for corn and small grain, erosion is a hazard. Zero tillage on the contour combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes helps to control erosion. A permanent cover of pasture plants or hay also helps to prevent excessive soil losses.

The slope is a limitation if this soil is used as a septic tank absorption field. Absorption field laterals should be installed on the contour.

The shrink-swell potential and the slope are limitations if this soil is used as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling may be needed when sites for dwellings are prepared. Sediment trap basins can be used during construction to prevent sedimentation. Low strength, slope, and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by low strength and frost action. Cutting and filling may be needed when roads and streets are constructed. Adding mulch until seedings are established helps to control erosion.

The land capability classification is IIIe.

290A—Warsaw loam, 0 to 2 percent slopes. This nearly level, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is black, friable loam about 10 inches thick. The subsoil is about 18 inches thick. The upper part is dark yellowish brown, friable clay loam. The lower part is dark brown, very friable gravelly sandy loam. The substratum to a depth of 60 inches is yellowish brown, loose, mildly alkaline, stratified sand and gravel. In some places the soil contains less sand in the subsoil and is deeper to the substratum. In other places the subsoil is thinner. In a few places the soil is deeper to the substratum.

Included with this soil in mapping are small areas of the poorly drained Will soils. These soils are in the lower landscape positions. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Warsaw soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is slightly acid and neutral. The potential for frost action is moderate.

Most areas are cultivated. The soil is moderately suited to cultivated crops. It is well suited to dwellings and to hay and pasture. It is poorly suited to septic tank absorption fields and moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, drought is a hazard. Returning crop residue to the soil or adding other organic material helps to maintain fertility, increases the rate of water infiltration, and conserves moisture. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIs.

290B2—Warsaw silt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained soil is on stream terraces and outwash plains. Individual areas are irregular in shape and range from 5 to 45 acres in size.

Typically, the surface layer is mixed dark brown and brown, friable silt loam about 8 inches thick. The subsoil is about 22 inches thick. It is friable. The upper part is yellowish brown silt loam. The next part is yellowish brown loam. The lower part is brown gravelly loam. The substratum to a depth of 60 inches is dark yellowish brown, loose, mildly alkaline, stratified sand and gravelly

sand. In some places the surface layer is thicker. In other places the depth to calcareous material is more than 40 inches. In a few places the subsoil is at a greater depth. In some areas the depth to the substratum is more than 40 inches. In a few areas the subsoil contains less clay.

Included with this soil in mapping are small areas of the excessively drained Rodman soils. These soils are in the more sloping areas. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Warsaw soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is low. Organic matter content is moderate. The subsoil is neutral. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture and to dwellings. It is poorly suited to septic tank absorption fields and moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, or terraces help to control erosion. Returning crop residue to the soil or adding other organic material helps to maintain fertility, increases the rate of water infiltration, and conserves moisture. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIe.

290C2—Warsaw loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is along drainageways in the uplands. Individual areas are irregular in shape and range from 3 to 10 acres in size.

Typically, the surface layer is mixed dark brown and brown, friable loam about 7 inches thick. The subsoil is about 22 inches thick. It is friable. The upper part is yellowish brown clay loam. The lower part is dark brown gravelly clay loam. The substratum to a depth of 60 inches is yellowish brown, loose, mildly alkaline, stratified sand and gravel. In places it is not alkaline. In a few areas it is calcareous loam. In a few places the depth to the substratum is greater.

Included with this soil in mapping are small areas of the excessively drained Rodman soils. These soils are more sloping than the Warsaw soil and are in the downslope areas. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Warsaw soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is slightly acid or neutral. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay and pasture and to dwellings. It is poorly suited to septic tank absorption fields and moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses. Returning crop residue to the soil or adding other organic material helps to maintain fertility, increases the rate of water infiltration, and conserves moisture. Irrigation can supply additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIIe.

321—Du Page silt loam. This nearly level, moderately well drained soil is on flood plains. It is occasionally flooded for brief periods from April to June. Individual areas are irregular in shape and range from 6 to 40 acres in size.

Typically, the surface layer is black, friable silt loam about 8 inches thick. The subsurface layer is black and very dark grayish brown, friable loam about 31 inches thick. The subsoil is dark grayish brown, friable loam about 13 inches thick. The substratum to a depth of 60 inches is dark grayish brown, very friable sandy loam. This soil is calcareous throughout. In some places the surface layer is thinner. In other places the surface layer and the subsurface layer contain more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson, poorly drained Millington, and well drained Ross soils. Ross soils are in the higher landscape positions and are subject to rare flooding. They are not calcareous. Lawson soils are in the slightly lower landscape positions. They are not calcareous. Millington soils are in old stream channels

and are frequently flooded. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Du Page soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is mildly alkaline. The potential for frost action is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the occasional flooding.

In areas used for corn, soybeans, and small grain, the occasional flooding is a hazard. Dikes or diversions help to reduce the crop damage caused by the floodwater. Ditches help to remove excess water. The high content of lime decreases the availability of applied phosphorus and potassium. As a result, additional applications of phosphorus and potassium may be needed.

Low strength and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

329—Will loam. This nearly level, poorly drained soil is on outwash plains. It is occasionally flooded for brief periods from April to June. Individual areas are irregular in shape and range from 3 to 200 acres in size.

Typically, the surface layer is black, friable loam about 6 inches thick. The subsurface layer is black, friable loam about 5 inches thick. The subsoil is dark gray, mottled, friable loam about 18 inches thick. The substratum to a depth of 60 inches is gray, mottled, loose gravelly loamy sand. In some areas, the gravelly loamy sand is at a depth of more than 40 inches and the subsoil contains less sand.

Included with this soil in mapping are small areas of Canisteo soils in similar positions on the landscape. These soils have lime throughout. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Will soil at a moderate rate and through the substratum at a rapid rate. Surface runoff is slow in cultivated areas. A seasonal high water table is within a depth of 2.0 feet during the spring. Available water capacity is moderate. Organic matter content is high. The subsoil is neutral. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the occasional flooding and the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Also, it is adequately protected from flooding. Measures that maintain the drainage system are needed. Enclosing subsurface drains with filters or envelope material helps to prevent the accumulation of sand in the conduit. Subsurface drains and ditches help to remove excess water. Dikes or diversions help to reduce the extent of the damage caused by the floodwater. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, low strength, and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

332A—Billett fine sandy loam, 0 to 3 percent slopes. This nearly level, well drained soil is on uplands and terraces. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark brown, very friable fine sandy loam about 7 inches thick. The subsoil is about 26 inches thick. It is very friable. The upper part is dark brown fine sandy loam. The next part is strong brown loamy sand. The lower part is strong brown fine sand. The substratum to a depth of 60 inches is yellowish brown, loose fine sand. In some places the surface layer is thicker. In other places the surface layer and the subsoil contain more sand.

Included with this soil in mapping are small areas of the very poorly drained Gilford, poorly drained Orio, and somewhat poorly drained Hoopeston soils. These soils are in shallow depressions and drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Billett soil at a moderately rapid rate and through the substratum at a rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is low. Organic matter content is moderately low. The subsoil is medium acid and slightly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings and septic tank absorption fields. It is moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting helps to control soil blowing and conserve moisture. Winter cover crops and field windbreaks also help to control soil blowing. Irrigation commonly supplies additional water.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the

base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIIs.

332B—Billett fine sandy loam, 3 to 7 percent slopes. This gently sloping, well drained soil is on uplands and terraces. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed very dark grayish brown and yellowish brown, friable fine sandy loam about 8 inches thick. The subsoil is about 25 inches thick. The upper part is yellowish brown, friable fine sandy loam. The next part is yellowish brown, very friable loamy fine sand. The lower part is mixed strong brown and reddish yellow, very friable loamy fine sand and fine sand. The substratum to a depth of 60 inches is yellowish brown, loose fine sand. In some places the surface layer is thicker. In other places the surface layer and the subsoil contain less clay.

Included with this soil in mapping are small areas of the very poorly drained Gilford, poorly drained Orio, and somewhat poorly drained Hoopeston soils. These soils are in shallow depressions and drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Billett soil at a moderately rapid rate and through the substratum at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is low. Organic matter content is moderately low. The subsoil is strongly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings and septic tank absorption fields. It is moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing, drought, and water erosion are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, or terraces help to prevent excessive soil losses and conserve moisture. Winter cover crops and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIIe.

332C2—Billett fine sandy loam, 5 to 12 percent slopes, eroded. This sloping, well drained soil is on side slopes along drainageways in the uplands. Individual areas are irregular in shape and range from 3 to 50 acres in size.

Typically, the surface layer is very dark grayish brown, friable fine sandy loam about 8 inches thick. The subsoil is about 22 inches thick. It is strong brown and friable. The upper part is fine sandy loam. The lower part is sandy loam. The substratum to a depth of 60 inches is light yellowish brown, friable, mildly alkaline sandy loam. In places the subsoil contains more clay.

Included with this soil in mapping are small areas of the somewhat excessively drained Eleva and excessively drained Rodman soils and small areas of Whalan soils. These soils are in positions on the landscape similar to those of the Billett soil. Eleva and Whalan soils have bedrock at a depth of 20 to 40 inches. Rodman soils formed in sand and gravel. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Billett soil at a moderately rapid rate and through the substratum at a rapid rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is medium acid. The potential for frost action is moderate.

Most areas are used for cultivated crops. Some are used for pasture. This soil is moderately suited to cultivated crops, hay, and pasture and to dwellings, local roads and streets, and septic tank absorption fields. It is well suited to habitat for openland wildlife.

In areas used for corn, soybeans, and small grain, soil blowing, drought, and water erosion are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes help to prevent excessive soil losses and conserve moisture. Winter cover crops and field windbreaks help to control soil blowing.

In areas used for hay and pasture, erosion is a hazard, particularly during periods when the plants are being established. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion.

The slope is a limitation if this soil is used as a septic tank absorption field. A serial distribution system should be used when field laterals are installed.

The slope is a limitation if this soil is used as a site for dwellings. Cutting and filling may be needed when sites for dwellings are prepared. Sediment trap basins can be used during construction to prevent the sedimentation of surface water. Slope and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by frost action. Cutting and filling may be needed when roads and streets are constructed. Adding mulch until seedings are established helps to control erosion.

The land capability classification is IIIe.

350—Drummer silty clay loam, gravelly substratum. This nearly level, poorly drained soil is on outwash plains. It is ponded for brief periods from March to June. Individual areas are irregular in shape and range from 20 to 600 acres in size.

Typically, the surface layer is black, friable silty clay loam about 7 inches thick. The subsurface layer is black, friable clay loam about 4 inches thick. The subsoil is about 34 inches thick. It is mottled and friable. The upper part is grayish brown silty clay loam. The next part is olive gray and gray silty clay loam. The lower part is olive gray, mildly alkaline clay loam. The substratum to a depth of 60 inches is pale brown, loose, mildly alkaline gravelly loamy sand. In some places the substratum does not contain gravel. In other places the upper 60 inches does not have loamy material. In a few places the surface layer and the subsoil contain more sand. In some areas gravel is closer to the surface. In a few areas the depth to a seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas of Harpster and Waupecan soils. The moderately well drained Waupecan soils are in the higher landscape positions. Harpster soils are in positions on the landscape similar to those of the Drummer soil. They have a high content of lime throughout. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Drummer soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is neutral and mildly alkaline. The surface layer is friable but becomes hard and cloddy if tilled when wet. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain, but ponding is a hazard. Measures that maintain the drainage system are needed. Subsurface drains and ditches remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, low strength, and frost action are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

351—Elburn silt loam, gravelly substratum. This nearly level, somewhat poorly drained soil is on outwash plains. Individual areas are irregular in shape and range from 10 to 100 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 6 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 42 inches thick. It is mottled and friable. The upper part is brown silty clay loam. The next part is grayish brown silty clay loam and olive gray silt loam. The lower part is olive gray sandy loam. The substratum to a depth of 60 inches is olive gray, loose, mildly alkaline sand and gravel. In some places the substratum contains less gravel. In other places the lower part of the subsoil and the substratum are silt loam. In some areas the depth to a seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Drummer soils that have a gravelly substratum. These soils are ponded for brief periods and are in the slightly lower landscape positions. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Elburn soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In areas used for corn, soybeans, and small grain, artificial drainage may be needed. Subsurface drains function well if suitable outlets are available. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table is a limitation if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water. Elevating the absorption field with suitable fill material and installing perimeter drains also help to overcome the wetness.

The seasonal high water table is a limitation if this soil is used as a site for dwellings. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Subsurface drains around foundations help to remove excess water. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is I.

355A—Binghampton sandy loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on till plains. Individual areas are irregular in shape and range from 5 to 70 acres in size.

Typically, the surface layer is very dark grayish brown, friable sandy loam about 8 inches thick. The subsoil extends to a depth of about 60 inches. It is mottled. The upper part is brown and grayish brown, friable loam and

light brownish gray, friable sandy loam. The next part is pale brown, very friable sand and dark brown, friable sand. The lower part is very dark grayish brown and light gray, firm clay loam. In some places the surface layer is thicker. In other places the subsoil contains more clay and less sand. In a few places the surface layer is silt loam. In some areas the depth to a seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the well drained Dakota and poorly drained Thorp Variant soils. Dakota soils are on low dunal ridges. Thorp Variant soils are in depressions. Included soils make up 5 to 15 percent of the unit.

Water and air move through the upper part of the Binghampton soil at moderate rate, through the middle part of the subsoil at a very rapid rate, and through the lower part of the subsoil at a moderately slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is strongly acid to neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings without basements and poorly suited to dwellings with basements and to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting helps to control soil blowing and conserves moisture. Winter cover crops and field windbreaks also help to control soil blowing. Irrigation commonly supplies additional water. Artificial drainage may be needed. Drainage should be carefully controlled, however, because the soil is droughty. Enclosing subsurface drainage conduits with filters or envelope material helps to prevent the accumulation of sand in the conduit.

If this soil is used as a septic tank absorption field, the seasonal high water table, the restricted permeability, and the poor filtering capacity are limitations. The poor filtering capacity may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The seasonal high water table is a limitation if this soil is used as a site for dwellings. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Subsurface drains help to remove excess water from around foundations, basement walls, and floors. Enclosing the subsurface drains with filters or envelope material helps to prevent the accumulation of sand in the conduit. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Frost action is a hazard on sites for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIs.

357B—Vanpetten loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on till plains. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is very dark gray, friable loam about 6 inches thick. The subsurface layer is very dark grayish brown, friable loam about 6 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark brown, friable silt loam. The next part is dark brown, yellowish brown, and dark yellowish brown, very friable sandy loam, coarse sand, and loamy coarse sand. The lower part is gray, mottled, friable clay loam. In some places the thickness of the surface layer combined with that of the subsurface layer is less than 10 inches. In other places the subsoil contains more clay and less sand. In some areas the soil is somewhat poorly drained. In a few places the subsoil contains more sand.

Included with this soil in mapping are small areas of the poorly drained Thorp Variant soils. These soils are in depressions. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Vanpetten soil at a moderate rate, through the middle part of the subsoil at a very rapid rate, and through the lower part of the subsoil at a moderately slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 3.0 to 5.0 feet below the surface during the spring. Available water capacity is moderate. Organic mattter content also is moderate. The subsoil is very strongly acid to slightly acid. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to dwellings and local roads and streets. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, and small grain, erosion and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting (fig. 7), contour farming, or terraces help to prevent excessive soil losses. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the seasonal high water table, the restricted permeability, and the poor filtering capacity are limitations. The poor filtering capacity may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The seasonal high water table is a limitation if this soil is used as a site for dwellings. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Subsurface drains help to remove excess water from around basement walls and floors. Enclosing the subsurface drains with filters or envelope material helps to prevent the accumulation of sand in the conduit.

Figure 7.—Chiseled cornstalks in an area of Vanpetten loam, 1 to 5 percent slopes. Leaving 3,000 to 4,000 pounds of crop residue per acre on the surface helps to control erosion.

Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. The shrink-swell potential and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

361D2—Kidder silt loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on side slopes along drainageways on dissected till plains. Individual areas are elongated and range from 5 to 20 acres in size.

Typically, the surface layer is mixed dark brown and yellowish brown, friable silt loam about 7 inches thick. The subsoil is about 30 inches thick. It is friable. The upper part is brown clay loam. The lower part is strong brown sandy loam. The substratum to a depth of 60 inches is brownish yellow, friable, mildly alkaline sandy loam. In some places the lower part of the subsoil and the substratum contain more clay. In other places the surface layer is darker or contains more sand. In some areas the slope is less than 10 percent.

Included with this soil in mapping are small areas of Comfrey and Whalan soils. The poorly drained Comfrey soils are in drainageways. Whalan soils are in positions on the landscape similar to those of the Kidder soil. They have bedrock within a depth of 40 inches. Included soils make up 5 to 15 percent of the unit.

Water and air move through the upper part of the Kidder soil at a moderate rate and through the substratum at a moderately rapid rate. Surface runoff is

rapid in cultivated areas. Available water capacity is moderate. Organic matter content is moderately low. The subsoil is medium acid to neutral. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to septic tank absorption fields, dwellings, and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. Zero tillage on the contour combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes helps to prevent excessive soil losses. A permanent cover of pasture plants or hay also helps to prevent excessive soil losses.

The slope is a limitation if this soil is used as a septic tank absorption field. Absorption field laterals should be installed on the contour.

The slope is a limitation if this soil is used as a site for dwellings. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Sediment trap basins can be used during construction to prevent the sedimentation of surface water. Low strength, the shrink-swell potential, slope, and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by low strength, shrinking and swelling, and frost action. Cutting and filling may be needed when roads and streets are constructed. Adding mulch until seedings are established helps to control erosion.

The land capability classification is IIIe.

363C2—Griswold loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on till plains. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable loam about 7 inches thick. The subsoil is about 27 inches thick. It is dark yellowish brown and friable. The upper part is clay loam. The next part is sandy clay loam. The lower part is sandy loam. The substratum to a depth of 60 inches is brownish yellow and light yellowish brown, friable, mildly alkaline sandy loam. In some places, the subsoil is thicker and the substratum is below a depth of 60 inches. In a few places the subsoil and the substratum contain less sand.

Included with this soil in mapping are small areas of the excessively drained Rodman soils and small severely eroded areas where mildly alkaline sandy loam glacial till is exposed. Included areas are on the steeper parts of side slopes. They make up 5 to 10 percent of the unit.

Water and air move through the Griswold soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is slightly acid or neutral. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to local roads and streets. It is well suited to dwellings and septic tank absorption fields.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIIe.

363D2—Griswold loam, 10 to 15 percent slopes, eroded. This strongly sloping, well drained soil is on dissected till plains. Individual areas are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable loam about 7 inches thick. The subsoil is about 21 inches thick. It is friable. The upper part is dark yellowish brown clay loam. The lower part is yellowish brown sandy loam. The substratum to a depth of 60 inches is yellowish brown, friable, mildly alkaline sandy loam. In places, the subsoil is thicker and the mildly alkaline substratum is below a depth of 60 inches. In a few places the subsoil and the substratum contain less sand.

Included with this soil in mapping are small areas of the excessively drained Rodman soils and small severely eroded areas where mildly alkaline sandy loam glacial till is exposed. Included areas make up 10 to 15 percent of the unit.

Water and air move through the Griswold soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is slightly acid or neutral. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to septic tank absorption fields, dwellings, and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. Zero tillage on the contour combined with a cropping sequence that includes 1 year of row crops, 1 year of small grain, and 1 year of grasses and legumes helps to prevent excessive soil loss. A permanent cover of pasture plants or hay also helps to control erosion.

The slope is a limitation if this soil is used as a septic tank absorption field. Absorption field laterals should be installed on the contour.

The slope is a limitation if this soil is used as a site for dwellings. Cutting and filling may be needed when sites for dwellings are prepared. Sediment trap basins can be used during construction to prevent the sedimentation of surface water. The slope and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by frost action. Cutting and filling may be needed when roads and streets are constructed. Adding mulch until seedings are established helps to control erosion.

The land capability classification is IIIe.

369A—Waupecan silt loam, 0 to 2 percent slopes. This nearly level, moderately well drained soil is on terraces and outwash plains. Individual areas are irregular in shape and range from 15 to 600 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 5 inches thick. The subsoil is about 35 inches thick. It is friable. The upper part is brown silty clay loam. The next part is dark yellowish brown and yellowish brown, mottled silty clay loam. The lower part is dark yellowish brown, mottled silty clay loam and dark brown gravelly clay loam. The substratum to a depth of 60 inches is brown, loose, mildly alkaline sand and gravel. In some places the surface layer is thinner. In other places gravel is closer to the surface. In some areas the soil has a loamy substratum and does not contain gravel. In other areas the lower part of the subsoil and the substratum are silt loam.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Elburn soils that have a gravelly substratum. These soils are on the slightly lower parts of the landscape. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Waupecan soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is strongly acid and medium acid. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields. It is poorly suited to local roads and streets.

This soil has few limitations when used for corn, soybeans, and small grain. Returning crop residue to the soil or adding other organic material helps to maintain fertility and increases the rate of water infiltration.

The seasonal high water table is a limitation if this soil is used as a septic tank absorption field. Subsurface drains remove excess water. Enclosing drainage conduits with a filter or envelope material helps to prevent the accumulation of sand in the conduit.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains remove excess water from around basement walls and foundations. Enclosing drainage conduits with a filter or envelope material helps to prevent the accumulation of sand in the conduit. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is I.

369B2—Waupecan silt loam, 2 to 5 percent slopes, eroded. This gently sloping, moderately well drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 8 inches thick. The subsoil is about 49 inches thick. It is friable. The upper part is yellowish brown silt loam and silty clay loam. The next part is yellowish brown, mottled silty clay loam and silt loam. The lower part is yellowish brown, mottled sandy loam. The substratum to a depth of 60 inches is yellowish brown, mottled, friable gravelly sandy loam. In some places the lower part of the subsoil and the substratum are silt loam. In other places the surface layer is thicker. In some areas the substratum contains less gravel. In a few places, the subsoil is thinner and sand and gravel are within a depth of 40 inches.

Included with this soil in mapping are small areas of the poorly drained Drummer and somewhat poorly drained Elburn soils that have a gravelly substratum. These soils are in drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Waupecan soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid and neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is moderately suited to dwellings and septic tank absorption fields and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming.

The seasonal high water table is a limitation if this soil is used as a septic tank absorption field. Subsurface drains remove excess water. Enclosing drainage conduits with a filter or envelope material helps to prevent the accumulation of sand in the conduit.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains remove excess water from around basement walls and foundations. Enclosing drainage conduits with a filter or envelope material helps to prevent the accumulation of sand in the conduit. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

379B2—Dakota sandy loam, 1 to 7 percent slopes, eroded. This gently sloping, well drained soil is on low dunal ridges on outwash plains. Individual areas are long and narrow or crescent shaped and range from 5 to 40 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable sandy loam about 8 inches thick. The subsoil is about 27 inches thick. The upper part is dark yellowish brown, friable loam. The next part is dark yellowish brown, friable sandy loam. The lower part is yellowish brown, very friable loamy sand. The substratum to a depth of 60 inches is yellowish brown, loose sand. In some places the sandy subsoil is underlain by clay loam. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of the somewhat poorly drained Binghampton and excessively drained Sparta soils. Binghampton soils are in the lower landscape positions. Sparta soils are in positions on the landscape similar to those of the Dakota soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Dakota soil at a moderate rate and through the substratum at a rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is low. Organic matter content is moderate. The subsoil is strongly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings. It is poorly suited to septic tank absorption fields and moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing, drought, and water erosion are hazards. Contour farming and a system of conservation tillage that leaves crop residue on the surface after planting help to prevent excessive soil loss and conserve moisture. Winter cover crops and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

Frost action and low strength are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

386B—Downs silt loam, 2 to 5 percent slopes. This gently sloping, moderately well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark brown, friable silt loam about 8 inches thick. The subsoil to a depth of 60 inches is friable silty clay loam. The upper part is dark brown. The next part is dark yellowish brown. The lower part is dark yellowish brown and yellowish brown and is mottled. In some places the surface layer is thicker. In other places it is lighter colored. In a few places the depth to a seasonal high water table is less than 4 feet.

Water and air move through this soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings and septic tank absorption fields and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting, by contour farming, or by terraces.

The seasonal high water table is a limitation if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains remove excess water from around basement walls and foundations. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

411B—Ashdale silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is very dark brown, friable silt loam about 9 inches thick. The subsurface layer is dark brown, friable silt loam about 4 inches thick. The subsoil is about 39 inches thick. The upper part is dark yellowish brown, firm silty clay loam. The next part is dark yellowish brown, firm silt loam. The lower part is mixed yellowish red and dark yellowish brown, firm silty clay. Yellowish red and brownish yellow fractured limestone bedrock is at a depth of about 52 inches. In some places the depth to bedrock is more than 60 inches. In other places, the lower part of the subsoil contains more sand and the depth to bedrock is more than 60 inches. In a few places the depth to bedrock is less than 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn soils. These soils are in the less sloping areas. They do not have bedrock within a depth of 60 inches. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Ashdale soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. Root growth is restricted by the limestone bedrock at a depth of 40 to 60 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to dwellings. It is poorly suited to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming.

The depth to bedrock and the restricted permeability are limitations if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the depth to bedrock is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Basements can be built above the bedrock. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

411C2—Ashdale silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed very dark gray and dark yellowish brown, friable silt loam about 9 inches thick. The subsoil is about 47 inches thick. The upper part is dark yellowish brown, friable silt loam. The next part is dark yellowish brown, firm clay loam and yellowish brown, firm silt loam. The lower part is brown, firm clay. Brownish yellow fractured limestone bedrock is at a depth of about 56 inches. In some places the depth to limestone bedrock is more than 60 inches. In other places, the lower part of the subsoil contains more sand and the depth to bedrock is more than 60 inches. In some areas the depth to bedrock is less than 40 inches.

Included with this soil in mapping are small areas of the somewhat poorly drained Elburn soils. These soils are in the less sloping areas. They do not have bedrock within a depth of 60 inches. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Ashdale soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is strongly acid to neutral. Root growth is restricted by the limestone bedrock at a depth of 40 to 60 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to dwellings. It is poorly suited to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes help to prevent excessive soil losses.

The depth to bedrock and the restricted permeability are limitations if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the depth to bedrock is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Basements can be built above the bedrock. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

429C—Palsgrove silt loam, 5 to 10 percent slopes. This sloping, well drained soil is on side slopes along upland drainageways. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil is about 40 inches thick. The upper part is dark yellowish brown and yellowish brown, friable silty clay loam. The next part is brown and reddish brown, friable sandy clay loam. The lower part is red, firm clay. Yellow fractured limestone bedrock is at a depth of about 47 inches. In some places the surface layer is darker and thicker. In other places the subsoil contains more sand.

Included with this soil in mapping are small areas of St. Charles and Whalan soils in similar positions on the landscape. Whalan soils have bedrock at a depth of 20 to 40 inches. St. Charles soils do not have bedrock within a depth of 60 inches. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Palsgrove soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is moderate. Organic matter content is low. The subsoil is medium acid to neutral. Root growth is restricted by the limestone bedrock at a depth of 40 to 60 inches. The shrink-swell potential is moderate in the upper part of the subsoil and high in the lower part. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to dwellings and septic tank absorption fields. It is poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses.

The depth to bedrock and the restricted permeability are limitations if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. The depth to bedrock also is a limitation on sites for dwellings with basements, but the basements can be built above the bedrock. Low strength and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

440A—Jasper silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 300 acres in size.

Typically, the surface layer is black, friable silt loam about 6 inches thick. The subsurface layer is friable silt loam about 12 inches thick. It is very dark brown in the upper part and dark brown in the lower part. The subsoil is about 24 inches thick. It is friable. The upper part is brown silt loam. The lower part is yellowish brown loam. The substratum to a depth of 60 inches is yellowish brown, mottled, friable, stratified silt loam, loam, and sandy loam. In some places the lower part of the subsoil and the substratum contain more sand. In other places limestone bedrock is below a depth of 40 inches. In some areas the lower part of the subsoil is mottled.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue soils. These soils are in shallow depressions and along drainageways. They make up 5 to 10 percent of the unit.

Water and air move through the Jasper soil at a moderate rate. Surface runoff is slow in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid and slightly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture and to septic tank absorption fields and dwellings. It is moderately suited to local roads and streets.

This soil has few limitations when used for corn, soybeans, and small grain. Returning crop residue to the soil or adding other organic material helps to maintain fertility and increases the rate of water infiltration.

Frost action and low strength are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is I.

440B—Jasper silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsurface layer is dark brown, friable silt loam about 4 inches thick. The subsoil is about 30 inches thick. It is dark yellowish brown and friable. The upper part is clay loam. The lower part is silt loam. The substratum to a depth of 60 inches is dark yellowish brown, friable silt loam. In places the lower part of the subsoil and the substratum contain more sand. In a few places the subsoil contains less sand. In some areas the surface layer and the subsoil are thinner. In a few areas the surface layer is thinner. In other areas the lower part of the subsoil is mottled.

Included with this soil in mapping are small areas of the excessively drained Dickinson and somewhat poorly

drained La Hogue and Nachusa soils and small areas of Rockton soils. Rockton soils are underlain by bedrock at a depth of 20 to 40 inches. They are in positions on the landscape similar to those of the Jasper soil. Dickinson soils are on narrow dunes. La Hogue and Nachusa soils are in the slightly lower areas. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Jasper soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is neutral and slightly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture and to dwellings and septic tank absorption fields. It is moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming.

Frost action and low strength are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

440C2—Jasper silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on side slopes along drainageways. Individual areas are irregular in shape and range from 3 to 100 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsoil is about 40 inches thick. It is friable. The upper part is dark yellowish brown clay loam. The next part is yellowish brown clay loam. The lower part is yellowish brown silt loam. The substratum to a depth of 60 inches is yellowish brown, mottled, friable silt loam. In places the subsoil contains less sand. In a few places the substratum contains more sand. In some areas the lower part of the subsoil is mottled.

Included with this soil in mapping are small areas of the somewhat excessively drained Dickinson and somewhat poorly drained La Hogue soils. Dickinson soils are in positions on the landscape similar to those of the Jasper soil. La Hogue soils are in the slightly lower landscape positions. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Jasper soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid and neutral. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and hay. It is well suited to dwellings and septic tank absorption fields and moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes help to prevent excessive soil losses.

Frost action and low strength are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

447—Canisteo silt loam, sandy substratum. This nearly level, poorly drained soil is on outwash plains and lake plains. It is occasionally flooded for brief periods from April to June. Individual areas are irregular in shape and range from 5 to 800 acres in size.

Typically, the surface layer is black, friable, mildly alkaline silt loam about 8 inches thick. The subsurface layer is very dark gray, friable, mildly alkaline silt loam about 5 inches thick. The subsoil is about 41 inches thick. It is friable and mildly alkaline. The upper part is dark gray silt loam. The next part is gray, mottled silt loam. The lower part is mottled very dark gray and dark gray loam. The substratum to a depth of 60 inches is olive gray, loose, mildly alkaline sand. In places less sand is throughout the profile. In a few places the soil is deeper to calcareous material.

Included with this soil in mapping are small areas of the very poorly drained Gilford and somewhat poorly drained Hoopeston soils. These soils have a neutral to medium acid subsoil. Hoopeston soils are slightly higher on the landscape than the Canisteo soil. Gilford soils are in positions on the landscape similar to those of the Canisteo soil. Included soils make up 2 to 10 percent of the unit.

Water and air move through the upper part of the Canisteo soil at a moderate rate and through the substratum at a rapid rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is within a depth of 1.0 foot during the spring. Available water capacity is high. Organic matter content also is high. Reaction is mildly alkaline throughout the profile. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the flooding and the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Subsurface drains and ditches remove excess water and help to control flooding. The high content of lime decreases the availability of applied phosphorus and potassium. As a result, additional

applications of phosphorus and potassium may be needed.

The seasonal high water table, low strength, frost action, and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

451—Lawson silt loam. This nearly level, somewhat poorly drained soil is on bottom land along the major streams and drainageways. It is occasionally flooded for brief periods from March to June. Individual areas are long and narrow and range from 4 to 200 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is friable silt loam about 26 inches thick. The upper part is very dark gray. The next part is black. The lower part is very dark gray and mottled. The substratum to a depth of 60 inches is friable silt loam. It is dark grayish brown in the upper part and grayish brown and mottled in the lower part. In some places the subsurface layer and the substratum contain more sand. In other places the soil has a buried surface layer of dark grayish brown silty clay loam. In a few places the subsurface layer is thicker.

Included with this soil in mapping are small areas of the poorly drained Millington and well drained Ross soils. Millington soils are calcareous throughout. They are in the lower landscape positions. Ross soils are in the higher landscape positions. Included soils make up 2 to 8 percent of the unit.

Water and air move through the Lawson soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.0 to 3.0 feet below the surface during the spring. Available water capacity is very high. Organic matter content is high. The subsurface layer is slightly acid. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the flooding and the seasonal high water table.

In areas used for corn, soybeans, and small grain, flooding may delay planting in some years. Artificial drainage may be needed. Subsurface drains and ditches help to remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

Frost action and flooding are hazards if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and elevating the roadbed with fill material help to overcome these hazards.

The land capability classification is IIw.

490A—Odell silt loam, 0 to 3 percent slopes. This nearly level, somewhat poorly drained soil is on the lower parts of ridges and knobs on till plains. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is black, friable silt loam about 7 inches thick. The subsurface layer is friable silt loam about 8 inches thick. It is black in the upper part and very dark gray in the lower part. The subsoil is about 25 inches thick. It is brown, mottled, and friable. The upper part is silty clay loam. The next part is clay loam. The lower part is loam. The substratum to a depth of 60 inches is yellowish brown, mottled, friable, mildly alkaline loam. In some places, the surface layer and the subsoil are thicker and the soil is deeper to calcareous material. In other places the subsoil contains more sand. In a few places the lower part of the subsoil and the substratum contain more sand.

Included with this soil in mapping are small areas of the poorly drained Clyde and well drained Parr soils. Clyde soils are in drainageways. Parr soils are in the more sloping areas. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Odell soil at a moderately slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is slightly acid to mildly alkaline. Root growth is somewhat limited by the massive loam glacial till below a depth of about 40 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to septic tank absorption fields, dwellings with basements, and local roads and streets. It is moderately suited to dwellings without basements.

In areas used for corn, soybeans, and small grain, artificial drainage may be needed. Subsurface drains function well if suitable outlets are available. Erosion may be a hazard in areas where the slope is 1 percent or more. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting.

The seasonal high water table and the restricted permeability are limitations if this soil is used as a septic tank absorption field. Elevating the absorption field with suitable fill material or installing perimeter drains helps to overcome the wetness. Enlarging the absorption field helps to overcome the restricted permeability.

The seasonal high water table is a limitation if this soil is used as a site for dwellings. Subsurface drains around foundations help to remove excess water. The shrink-swell potential is a limitation on sites for dwellings without basements. Reinforcing foundations, however,

helps to prevent the structural damage caused by shrinking and swelling. Frost action is a limitation on sites for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is I.

501—Morocco loamy fine sand. This nearly level, somewhat poorly drained soil is on outwash plains. Individual areas are irregular in shape and range from 5 to 600 acres in size.

Typically, the surface layer is dark brown, very friable loamy fine sand about 7 inches thick. The subsoil is about 31 inches thick. It is mottled and very friable. The upper part is yellowish brown loamy fine sand. The next part is pale brown sand. The lower part is light brownish gray sand. The substratum to a depth of 60 inches is yellowish brown, loose sand. In places, the surface layer is thicker and the upper part of the subsoil contains less sand.

Included with this soil in mapping are small areas of the excessively drained Chelsea, very poorly drained Gilford, and poorly drained Orio soils. Chelsea soils are on dunes. Gilford soils are in broad low areas. Orio soils are in shallow depressions. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Morocco soil at a rapid rate. Surface runoff is very slow in cultivated areas. A seasonal high water table is 1.0 to 2.0 feet below the surface during the spring. Available water capacity is low. Organic matter content also is low. The subsoil is very strongly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is poorly suited to cultivated crops and to dwellings and septic tank absorption fields. It is moderately suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting helps to control soil blowing and conserves moisture. Winter cover crops and field windbreaks also help to control soil blowing. Irrigation commonly supplies additional water.

The seasonal high water table and the rapid permeability are limitations if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The seasonal high water table is a limitation if this soil is used as a site for dwellings. Subsurface drains help to remove excess water from around basement walls and floors. Enclosing subsurface drainage conduits with filters or envelope material helps to prevent the accumulation of sand in the conduit. Wetness and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by frost action. Open ditches help to remove excess water.

The land capability classification is IVs.

503B—Rockton silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 10 inches thick. The subsoil is about 19 inches thick. The upper part is dark brown, friable clay loam. The next part is dark yellowish brown, friable clay loam. The lower part is dark yellowish brown, firm clay. Yellowish brown fractured limestone bedrock is at a depth of about 29 inches. In some places the surface layer is thinner and is mixed with the subsoil. In other places the depth to bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Jasper and Sogn soils. Jasper soils are in positions on the landscape similar to those of the Rockton soil. They do not have bedrock within a depth of 60 inches. The somewhat excessively drained Sogn soils are in the steeper areas. They have bedrock within a depth of 20 inches. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Rockton soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is low. Organic matter content is moderate. The subsoil is neutral. Root growth is restricted by the limestone bedrock at a depth of 20 to 40 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to dwellings and local roads and streets. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming.

The depth to bedrock and the restricted permeability in the subsoil are limitations if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the depth to bedrock is a limitation on sites for dwellings with basements. As a result, the soil is better suited to dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

503C2—Rockton silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 40 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable silt loam about 9 inches thick. The subsoil is about 15 inches thick. The upper part is dark yellowish brown, friable clay loam. The lower part is strong brown, firm clay. Yellowish brown and brownish yellow fractured limestone bedrock is at a depth of about 24 inches. In some places the surface layer is thicker. In other places, the subsoil contains more clay and the depth to bedrock is less than 20 inches. In a few places the depth to bedrock is more than 40 inches.

Included with this soil in mapping are small areas of Jasper and Sogn soils. Jasper soils do not have bedrock within a depth of 60 inches. Their positions on the landscape are similar to those of the Rockton soil. The somewhat excessively drained Sogn soils are on the steeper side slopes. They are shallow over bedrock. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Rockton soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is low. Organic matter content is moderate. The subsoil is neutral. Root growth is restricted by the limestone bedrock at a depth of 20 to 40 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to dwellings and local roads and streets. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes help to prevent excessive soil losses.

The depth to bedrock and the restricted permeability are limitations if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the depth to bedrock is a limitation on sites for dwellings with basements. As a result, the soil is better suited to dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

504D—Sogn loam, 7 to 15 percent slopes. This strongly sloping, somewhat excessively drained soil is on side slopes along upland drainageways. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 12 inches thick. Fractured limestone bedrock is at a depth of about 12 inches. In some places the surface layer contains more sand. In other places bedrock crops out.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson and well drained Whalan soils. Lawson soils are on narrow bottom land. Whalan soils have bedrock at a depth of 20 to 40 inches. They are in the higher landscape positions. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Sogn soil at a moderate rate. Surface runoff is rapid. Available water capacity is very low. Organic matter content is moderate. Root growth is restricted by the limestone bedrock at a depth of 4 to 20 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are pastured. This soil is poorly suited to pasture and to recreational development. It is moderately well suited to habitat for woodland wildlife. It is unsuited to dwellings and septic tank absorption fields because of the depth to bedrock.

In areas used for pasture, erosion and drought are hazards. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion. Planting drought-resistant grasses and legumes helps to establish a plant cover.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

In areas used for paths and trails that are subject to intensive foot traffic, mulching helps to control erosion.

The land capability classification is VIIs.

504F—Sogn loam, 15 to 35 percent slopes. This moderately steep and steep, somewhat excessively drained soil is on convex slopes in the uplands. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is very dark gray, friable loam about 10 inches thick. Fractured limestone bedrock is at a depth of about 10 inches. In some places the surface layer contains more sand. In other places bedrock crops out.

Included with this soil in mapping are small areas of the somewhat poorly drained Lawson and well drained Whalan soils. Lawson soils are on flood plains. Whalan

soils have bedrock at a depth of 20 to 40 inches. They are in the higher landscape positions. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Sogn soil at a moderate rate. Surface runoff is very rapid. Available water capacity is very low. Organic matter content is moderate. The surface layer is neutral. Root growth is restricted by the limestone bedrock at a depth of 4 to 20 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are pastured. This soil is poorly suited to pasture and to recreational development. It is moderately well suited to habitat for woodland wildlife. It is unsuited to dwellings and septic tank absorption fields because of the slope and the depth to bedrock.

In areas used for pasture, erosion and drought are hazards. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion. Planting drought-resistant grasses and legumes helps to establish a plant cover.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

In areas used for paths and trails that are subject to intensive foot traffic, mulching helps to control erosion.

The land capability classification is VIIs.

506B2—Hitt loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 10 to 60 acres in size.

Typically, the surface layer is mixed very dark grayish brown and dark yellowish brown, friable loam about 8 inches thick. The subsoil is about 46 inches thick. The upper part is dark yellowish brown, friable clay loam. The next part is reddish brown, friable sandy clay loam. The lower part is reddish brown, firm clay. Fractured limestone bedrock is at a depth of about 54 inches. In some places the surface layer is thicker. In other places the surface layer and the upper part of the subsoil are sandy loam. In a few places the lower part of the subsoil is yellowish brown. In some areas the depth to bedrock is less than 40 inches.

Included with this soil in mapping are small areas of Jasper and Sogn soils. Jasper soils are in positions on the landscape similar to those of the Hitt soil. They do not have bedrock within a depth of 60 inches. The somewhat excessively drained Sogn soils are in the more sloping areas along drainageways. They have bedrock within a depth of 20 inches. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Hitt soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is strongly acid to slightly acid. Root growth is restricted by the limestone bedrock at a depth of 40 to 60 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to dwellings. It is poorly suited to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces.

The depth to bedrock and the restricted permeability are limitations if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the depth to bedrock is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Basements can be built above the bedrock. Low strength is a limitation on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome this limitation.

The land capability classification is IIe.

508—Selma loam, bedrock substratum. This nearly level, poorly drained soil is on outwash plains. It has bedrock within a depth of 60 inches. It is occasionally flooded or ponded for brief periods from April to June. Individual areas are irregular in shape and range from 5 to 80 acres in size.

Typically, the surface layer is black, friable loam about 8 inches thick. The subsurface layer is black, mottled, friable clay loam about 10 inches thick. The subsoil is about 30 inches thick. It is mottled and friable. The upper part is grayish brown clay loam. The next part is grayish brown loam. The lower part is light brownish gray sandy loam. Fractured limestone bedrock is at a depth of about 48 inches. In some places the soil is not underlain by bedrock within a depth of 60 inches. In other places the subsurface layer is thicker.

Included with this soil in mapping are small areas that are undrained and are wet during most of the year. These areas make up 2 to 5 percent of the unit.

Water and air move through the Selma soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring.

Available water capacity is high. Organic matter content also is high. The subsoil is mildly alkaline and moderately alkaline. Root growth is restricted by the limestone bedrock at a depth of 40 to 60 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the flooding and the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains, diversions, and ditches help to divert floodwater and remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, flooding, and frost action are limitations if this soil is used as a site for local roads and streets. Providing open ditches or diversions, which remove or divert the excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

509B—Whalan loam, 2 to 7 percent slopes. This gently sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is very dark gray and brown, friable loam about 5 inches thick. The subsurface layer is brown, friable loam about 6 inches thick. The subsoil is about 21 inches thick. The upper part is brown, friable loam. The next part is brown, friable clay loam. The lower part is mixed dark brown and strong brown, firm clay. Fractured limestone bedrock is at a depth of about 32 inches. In places the surface layer contains more sand.

Included with this soil in mapping are small areas of Martinsville soils and small areas of the somewhat excessively drained Sogn soils. Martinsville soils are downslope from the Whalan soil. They do not have bedrock within a depth of 60 inches. Sogn soils are in the more sloping areas. They have limestone bedrock within a depth of 20 inches. Also included are some strongly sloping areas, which are lower on the landscape than the Whalan soil. Included areas make up 5 to 15 percent of the unit.

Water and air move through the upper part of the Whalan soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is medium. Available water capacity is low. Organic matter content is moderately low. The subsoil is medium acid or slightly acid. Root growth is restricted by the limestone bedrock at a depth of 20 to 40 inches. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to woodland. It is poorly suited to dwellings, septic tank absorption fields, and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming or terraces.

If this soil is used for woodland, plant competition is the main management concern. It can be controlled by harvesting mature trees, cutting cull trees, and thinning and weeding. Planting seedlings in a mulch or in an established cover crop helps to prevent excessive soil losses. Drought-resistant species should be selected for planting.

The depth to bedrock is a limitation if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the depth to bedrock is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. The soft bedrock can be excavated with some difficulty. Low strength and the shrink-swell potential are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

509D—Whalan loam, 7 to 15 percent slopes. This well drained, strongly sloping soil is on side slopes along upland drainageways. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 4 inches thick. The subsurface layer is dark yellowish brown and very dark grayish brown, friable loam about 3 inches thick. The subsoil is about 16 inches thick. It is firm. The upper part is dark brown clay loam. The lower part is strong brown clay. Fractured limestone bedrock is at a depth of about 23 inches. In some areas the surface layer is darker and thicker. In other areas the depth to bedrock is more than 40 inches. In some places the upper part of the subsoil contains less sand. In other places the subsoil contains more sand. In a few places the surface layer is mixed with the upper part of the subsoil.

Included with this soil in mapping are small areas of Martinsville and St. Charles soils and small areas of the somewhat excessively drained Sogn soils. Martinsville and St. Charles soils are more than 60 inches deep over bedrock. They are commonly upslope from the Whalan soil. Sogn soils have bedrock at a depth of 4 to 20 inches. They are downslope from the Whalan soil. Included soils make up 10 to 15 percent of the unit.

Water and air move through the upper part of the Whalan soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is low. Organic matter content is moderately low. The subsoil is slightly acid. Root growth is restricted by the limestone bedrock at a depth of 20 to 40 inches. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are wooded. This soil is well suited to woodland wildlife habitat and moderately suited to woodland. It is poorly suited to septic tank absorption fields, dwellings, and local roads and streets and to cultivated crops.

In the areas used for woodland, plant competition is the main management concern. It can be controlled by harvesting mature trees, cutting cull trees, and thinning and weeding. Planting seedlings on the contour and in an established cover crop helps to prevent excessive soil losses. Drought-resistant species should be selected for planting.

If this soil is used for cultivated crops, erosion and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting and contour farming combined with a cropping sequence dominated by grasses and legumes help to prevent excessive soil losses and conserve moisture.

The depth to bedrock is a limitation if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the depth to bedrock is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. The soft bedrock can be excavated with some difficulty. Low strength and the shrink-swell potential are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

509F—Whalan loam, 15 to 35 percent slopes. This moderately steep and steep, well drained soil is on side slopes along upland drainageways. Individual areas are irregular in shape and range from 5 to 70 acres in size.

Typically, the surface layer is very dark grayish brown, friable loam about 4 inches thick. The subsurface layer is brown, friable loam about 7 inches thick. The subsoil is firm clay loam about 12 inches thick. The upper part is brown. The lower part is dark yellowish brown. Fractured limestone bedrock is at a depth of about 23 inches. In places the subsoil contains less sand.

Included with this soil in mapping are small areas of Martinsville soils and small areas of the somewhat excessively drained Sogn soils. Martinsville soils do not have bedrock within a depth of 60 inches. They are upslope from the Whalan soil. Sogn soils have bedrock at a depth of 4 to 20 inches. They are lower on the landscape than the Whalan soil. Included soils make up 5 to 15 percent of the unit.

Water and air move through the upper part of the Whalan soil at a moderate rate and through the lower part of the subsoil at a slow rate. Surface runoff is rapid. Available water capacity is low. Organic matter content is moderately low. The subsoil is neutral. Root growth is restricted by the limestone bedrock at a depth of 20 to 40 inches. The shrink-swell potential is high. The potential for frost action is moderate.

Most areas are used for woodland wildlife habitat. This soil is well suited to woodland wildlife habitat and moderately suited to woodland and paths and trails. It is poorly suited to local roads and streets. It is unsuited to cultivated crops because of the slope, to dwellings because of the shrink-swell potential and the slope, and to septic tank absorption fields because of the depth to bedrock and the slope.

In the areas used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

In areas used for paths and trails that are subject to intensive foot traffic, mulching helps to control erosion.

If this soil is used for woodland, the erosion hazard, the equipment limitation, seedling mortality, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Planting drought-tolerant species and mulching help to overcome seedling mortality. Plant competition can be controlled by applying chemicals.

Low strength, the shrink-swell potential, and the slope are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by low strength and by shrinking and swelling. Grading to a more favorable

slope may be needed. Mulching and seeding roadbanks help to control erosion.

The land capability classification is VIe.

570A—Martinsville silt loam, 0 to 2 percent slopes. This nearly level, well drained soil is on stream terraces. Individual areas are irregular in shape and range from 5 to 60 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 5 inches thick. The subsurface layer is brown, friable silt loam about 6 inches thick. The subsoil is about 43 inches thick. It is dark yellowish brown and friable. The upper part is silt loam, the next part is loam, and the lower part is sandy loam. The substratum to a depth of 60 inches is yellowish brown, loose sand. In some places the surface layer is darker. In other places, the subsoil is thinner and sand is within a depth of 40 inches. In a few places the lower part of the subsoil and the substratum contain gravel.

Included with this soil in mapping are small areas of Billett soils. These soils are slightly higher on the landscape than the Martinsville soil. Also, they have a darker surface layer and contain more sand in the surface layer and subsoil. Also included are a few areas of somewhat poorly drained soils in the slightly lower landscape positions. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Martinsville soil at a moderate rate. Surface runoff is slow in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is strongly acid to neutral. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture and to septic tank absorption fields. It is moderately suited to dwellings and local roads and streets.

This soil has few limitations when used for corn, soybeans, and small grain. Returning crop residue to the soil or adding other organic material helps to maintain fertility and increases the rate of water infiltration.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is I.

570B—Martinsville silt loam, 2 to 5 percent slopes. This gently sloping, well drained soil is on terraces. Individual areas are irregular in shape and range from 5 to 50 acres in size.

Typically, the surface layer is brown and yellowish brown, friable silt loam about 8 inches thick. The subsoil is about 28 inches thick. It is friable. The upper part is yellowish brown loam. The next part is yellowish brown clay loam. The lower part is strong brown sandy loam. The substratum to a depth of 60 inches is strong brown, mottled, very friable, stratified sandy loam and loamy sand. In some places the surface layer is darker. In other places, the subsoil is thinner and sand is within a depth of 40 inches. In a few places the lower part of the subsoil and the substratum contain gravel.

Included with this soil in mapping are small areas of Billett and Whalan soils. Billett soils are slightly higher on the landscape than the Martinsville soil. Also, they have a darker surface layer and contain more sand in the surface layer and subsoil. Whalan soils have bedrock within a depth of 20 to 40 inches. They are on the lower side slopes. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Martinsville soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is medium acid. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops. It is well suited to hay and pasture and to septic tank absorption fields. It is moderately suited to dwellings and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

570C2—Martinsville silt loam, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on stream terraces and along drainageways in the uplands. Individual areas are irregular in shape and range from 5 to 35 acres in size.

Typically, the surface layer is dark brown, friable silt loam about 5 inches thick. The subsoil is about 46 inches thick. It is friable. The upper part is dark yellowish brown silt loam. The next part is dark yellowish brown silty clay loam and yellowish brown clay loam. The lower part is yellowish brown loam. The substratum to a depth of 60 inches is yellowish brown and dark brown, very friable, stratified loamy sand and sandy loam. In places less sand is in the upper part of the subsoil. In a few places the lower part of the subsoil and the substratum contain gravel.

Included with this soil in mapping are small areas of Billett and Whalan soils. Billett soils contain more sand in the surface layer and subsoil than the Martinsville soil. They are in the upslope areas. Whalan soils are in positions on the landscape similar to those of the Martinsville soil. They are underlain by limestone bedrock. Included soils make up 10 to 15 percent of the unit.

Water and air move through the Martinsville soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is medium acid to neutral. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay and pasture and to septic tank absorption fields. It is moderately suited to dwellings and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIIe.

570D—Martinsville silt loam, 10 to 15 percent slopes. This strongly sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 4 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is yellowish brown, mottled, friable silt loam about 5 inches thick. The subsoil is about 30 inches thick. It is yellowish brown. The upper part is friable loam. The next part is friable clay loam. The lower part is firm clay loam. The substratum to a depth of 60 inches is brown, mottled, friable, stratified loam and silt loam. In some places the upper part of the subsoil contains less sand. In other places the surface layer is moderately eroded and is mixed with the upper part of the subsoil. In a few places the lower part of the subsoil and the substratum contain gravel.

Included with this soil in mapping are small areas of the somewhat excessively drained Eleva and Sogn soils and small areas of Whalan soils. Eleva and Whalan soils are moderately deep over bedrock. They are downslope from the Martinsville soil. Sogn soils are on the steeper side slopes. They are shallow over bedrock. Included soils make up 5 to 12 percent of the unit.

Water and air move through the Martinsville soil at a moderate rate. Surface runoff is rapid. Available water capacity is high. Organic matter content is moderately low. The subsoil is strongly acid to neutral. The shrink-swell potential and the potential for frost action are moderate.

Most areas are wooded. This soil is well suited to woodland and woodland wildlife habitat. It is moderately suited to septic tank absorption fields, dwellings, and local roads and streets. It is poorly suited to cultivated crops.

In the areas used for woodland, planting seedlings on the contour and in an established cover crop helps to prevent excessive soil losses while the trees are being established. Plant competition can be controlled by harvesting mature trees, by cutting cull trees, and by thinning and weeding.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Wildlife food plots and additional cover can be established to provide food for woodland wildlife. The habitat should be protected from fire and grazing.

In areas used for corn, soybeans, and small grain, erosion is a hazard. Zero tillage and contour farming combined with a cropping sequence that is dominated by grasses and legumes help to control erosion. A permanent cover of pasture plants or hay also helps to prevent excessive soil losses.

The slope is a limitation if this soil is used as a septic tank absorption field. Absorption field laterals should be installed on the contour.

The shrink-swell potential and the slope are limitations if this soil is used as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling may be needed when sites for dwellings are prepared. Sediment trap basins can be used during construction to prevent the sedimentation of surface water. Low strength, slope, and frost action are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by low strength and frost action. Cutting and filling may be needed when roads and streets are constructed. Adding mulch until seedings are established helps to control erosion.

The land capability classification is IVe.

627B2—Miami fine sandy loam, 2 to 5 percent slopes, eroded. This gently sloping, well drained soil is on till plains. Individual areas are irregular in shape and range from 4 to 40 acres in size.

Typically, the surface layer is mixed dark grayish brown and strong brown, very friable fine sandy loam about 8 inches thick. The subsoil is about 20 inches

thick. The upper part is strong brown, friable loam. The next part is strong brown, firm clay loam. The lower part is light brown, firm loam. The substratum to a depth of 60 inches is light brown, firm, mildly alkaline loam. In some places more sand is in the upper part of the subsoil. In other places, the surface layer is eroded and the subsoil is exposed.

Included with this soil in mapping are small areas of the excessively drained Chelsea soils. These soils are on dunes. They make up 10 to 15 percent of the unit.

Water and air move through the Miami soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is neutral or mildly alkaline. Root growth is somewhat limited by the massive, firm loam glacial till below a depth of about 28 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and to septic tank absorption fields and dwellings without basements. It is well suited to woodland, hay, and pasture and to dwellings with basements and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing and erosion are hazards. A system of conservation tillage that leaves crop residue on the surface after planting and contour farming or terraces help to prevent excessive soil losses. Cover crops and field windbreaks also help to control soil blowing.

If this soil is used for woodland, plant competition is the main management concern. It can be controlled by applying chemicals and by harvesting mature trees, cutting cull trees, and thinning and weeding. Woodland should be protected from fire and grazing.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Low strength is a limitation on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome this limitation.

The land capability classification is IIe.

627C2—Miami fine sandy loam, 5 to 10 percent slopes, eroded. This gently sloping, well drained soil is on till plains near the major streams and rivers. Individual areas are irregular in shape and range from 5 to 30 acres in size.

Typically, the surface layer is mixed dark brown and brown, very friable fine sandy loam about 7 inches thick. The subsoil is about 28 inches thick. The upper part is brown, friable loam. The next part is brown, firm clay loam. The lower part is brown, firm loam. The substratum to a depth of 60 inches is brown, firm, mildly alkaline loam. In some places the sandy surface layer is 20 to 40 inches thick. In other places the subsoil is exposed and contains gravel.

Included with this soil in mapping are small areas of the excessively drained Chelsea soils. These soils are in the slightly higher landscape positions. They make up 5 to 10 percent of the unit.

Water and air move through the Miami soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. The subsoil is neutral to mildly alkaline. Root growth is somewhat limited by the massive, firm loam glacial till below a depth of about 35 inches. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops and well suited to hay, pasture, and woodland and to dwellings with basements. It is moderately suited to septic tank absorption fields and dwellings without basements and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, erosion and soil blowing are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 2 years of grasses and legumes help to prevent excessive soil losses. Winter cover crops and field windbreaks also help to control soil blowing.

If this soil is used for woodland, plant competition is the main management concern. It can be controlled by applying chemicals and by harvesting mature trees, cutting cull trees, and thinning and weeding. Woodland should be protected from fire and grazing.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings without basements. Reinforcing foundations, however, helps to prevent the structural damage caused by shrinking and swelling. Low strength is a limitation on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome this limitation.

The land capability classification is IIIe.

648—Clyde clay loam. This nearly level, poorly drained soil is in drainageways and broad low areas on till plains. Individual areas are irregular in shape and range from 3 to 200 acres in size.

Typically, the surface layer is black, friable clay loam about 6 inches thick. The subsurface layer is black and very dark gray, friable clay loam about 11 inches thick. The subsoil is about 28 inches thick. It is mottled. The

upper part is grayish brown, friable clay loam and silty clay loam. The next part is grayish brown and yellowish brown, very friable sandy loam. The lower part is yellowish brown, firm loam. The substratum to a depth of 60 inches is yellowish brown, mottled, firm, moderately alkaline loam. In places the substratum has layers of sand. In a few places the depth to a seasonal high water table is more than 2.5 feet.

Included with this soil in mapping are small areas of soils that have a moderately alkaline surface layer. These soils make up 1 to 5 percent of the unit.

Water and air move through the Clyde soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.0 to 2.5 feet below the surface during the spring. Available water capacity is high. Organic matter content is very high. The subsoil is neutral and mildly alkaline. The surface layer is friable but becomes hard and cloddy if tilled when wet. Root growth is somewhat limited by the massive, firm loam glacial till below a depth of about 45 inches. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is generally unsuited to dwellings and septic tank absorption fields because of the wetness caused by runoff from adjacent soils.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains and ditches help to remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

Low strength and frost action are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIw.

649—Nachusa silt loam. This nearly level, somewhat poorly drained soil is on the lower slopes and in broad low areas on till plains. Individual areas are irregular in shape and range from 3 to 120 acres in size.

Typically, the surface layer is black, friable silt loam about 11 inches thick. The subsoil extends to a depth of 60 inches. It is mottled. The upper part is dark grayish brown, friable silt loam and silty clay loam. The next part is yellowish brown, firm clay loam. The lower part is yellowish brown, friable loam. In some places, the subsoil is thinner and mildly alkaline layers are within a depth of 60 inches. In other places layers of sand or loamy sand are in the lower part of the subsoil. In a few places the depth to a seasonal high water table is more than 3 feet.

Included with this soil in mapping are small areas of the poorly drained Clyde and Thorp Variant soils. Clyde soils are in the lower landscape positions. Thorp Variant soils are in depressions. Included soils make up 5 to 15 percent of the unit.

Water and air move through the Nachusa soil at a moderately slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3.0 feet below the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsoil is slightly acid and neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to septic tank absorption fields, dwellings with basements, and local roads and streets. It is moderately suited to dwellings without basements.

In areas used for corn, soybeans, and small grain, artificial drainage may be needed. Subsurface drains function well if suitable outlets are available. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table and the restricted permeability are limitations if this soil is used as a septic tank absorption field. Subsurface drains help to remove excess water. Elevating the absorption field with suitable fill material also helps to overcome the wetness. Enlarging the absorption field helps to overcome the restricted permeability.

The seasonal high water table is a limitation if this soil is used as a site for dwellings. Also, the shrink-swell potential is a limitation on sites for dwellings without basements. Subsurface drains remove excess water from around basement walls and floors. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Frost action and low strength are limitations on sites for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is I.

650B—Prairieville silt loam, 1 to 5 percent slopes. This gently sloping, moderately well drained soil is on convex slopes on till plains. Individual areas are irregular in shape and range from 3 to 80 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 9 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 3 inches thick. The subsoil extends to a depth of 60 inches. The upper part is dark brown, friable silt loam. The next part is brown, friable loam. The lower part is yellowish brown, mottled, firm clay loam. In some places the subsoil is thinner and contains less clay. In other places the lower part of the subsoil contains more sand. In a few places the surface layer is thinner. In some areas the depth to a seasonal high water table is less than 4 feet.

Included with this soil in mapping are small areas of the poorly drained Clyde soils. These soils are in the

lower landscape positions. They make up 5 to 10 percent of the unit.

Water and air move through the Prairieville soil at a moderately slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4.0 to 6.0 feet below the surface during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is strongly acid to neutral. The shrink-swell potential and the potential for frost action are moderate.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is moderately suited to dwellings. It is poorly suited to septic tank absorption fields and local roads and streets.

In areas used for corn, soybeans, and small grain, erosion is a hazard. It can be controlled, however, by a system of conservation tillage that leaves crop residue on the surface after planting and by contour farming.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

The shrink-swell potential is a limitation if this soil is used as a site for dwellings. Also, the seasonal high water table is a limitation on sites for dwellings with basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Subsurface drains remove excess water from around basement walls and floors. Low strength is a limitation on sites for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by low strength.

The land capability classification is IIe.

727A—Waukee silt loam, 0 to 3 percent slopes. This nearly level, well drained soil is on outwash plains and stream terraces. Individual areas are irregular in shape and range from 5 to 150 acres in size.

Typically, the surface layer is very dark gray, friable silt loam about 7 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsoil is about 26 inches thick. It is dark yellowish brown and friable. The upper part is silt loam. The next part is sandy clay loam. The lower part is loamy sand. The substratum to a depth of 60 inches is loose sand. The upper part is dark yellowish brown, and the lower part is yellowish brown. In some places the surface layer and the upper part of the subsoil contain more sand. In other places the surface layer is sandy loam.

Included with this soil in mapping are small areas of the somewhat poorly drained La Hogue and poorly drained Selma soils. La Hogue soils are in the slightly lower landscape positions. Selma soils are in drainageways and depressions. Included soils make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Waukee soil at a moderate rate and through the substratum at a very rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is strongly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is well suited to dwellings and local roads and streets. It is poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, and small grain, drought is a hazard. Also, erosion is a hazard in areas where the slope is 1 percent or more. A system of conservation tillage that leaves crop residue on the surface after planting conserves moisture and helps to control erosion. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IIs.

741D3—Oakville fine sand, 7 to 20 percent slopes, severely eroded. This sloping to moderately steep, well drained soil is on outwash plains. It has been severely damaged by wind. Blowouts or dish-shaped depressions and deposits of sand are numerous in areas where the surface has been buried by windblown sand. Individual areas are irregular in shape and range from 2 to 60 acres in size.

Typically, the surface layer is dark brown, very friable fine sand about 3 inches thick. The subsoil is dark yellowish brown, very friable fine sand about 28 inches thick. The substratum to a depth of 60 inches is dark yellowish brown, loose sand. In some places it has bands of dark brown sand. In other places the slope is less than 7 percent.

Included with this soil in mapping are small areas of the excessively drained Chelsea and Sparta and somewhat poorly drained Morocco soils. These soils have not been seriously damaged by soil blowing. Chelsea soils have thin bands of brown loamy sand in the lower part of the subsoil. They are on dunal ridges. Morocco soils are in low areas between the dunes. They have a seasonal water table at a depth of 1.0 to 2.0 feet. Sparta soils are in positions on the landscape similar to those of the Oakville soil. Their dark surface layer is thicker than that of the Oakville soil. Included soils make up about 10 to 15 percent of the unit.

Water and air move through the Oakville soil at a very rapid rate. Surface runoff is slow. Available water capacity is low. Organic matter content is very low. The subsoil is very strongly acid.

Most areas are used for pasture. Some are idle and support only sparse vegetation. This soil is unsuited to cultivated crops because of the hazards of soil blowing and drought. It is poorly suited to pasture, deciduous

woodland, septic tank absorption fields, and most kinds of recreational development. It is moderately suited to coniferous woodland and to dwellings and local roads and streets.

In areas used for pasture, drought, soil blowing, and erosion are hazards, particularly during periods when the plants are being established. Controlling blowouts is extremely difficult, especially in areas where they are still active. In these areas a mulch seeding is needed to establish plants. Drought-resistant species should be selected for planting. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to control soil blowing and erosion.

If this soil is used for woodland, seedling mortality and plant competition are the main management problems. Mulching and planting drought-resistant species, such as red pine, eastern white pine, and jack pine, help to control seedling mortality. Plant competition can be controlled by applying chemicals. Woodland should be protected from fire and grazing.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the substratum may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The slope is a limitation if this soil is used as a site for dwellings or local roads and streets. Alteration of the slope by cutting and filling, however, helps to overcome this limitation.

The land capability classification is VIs.

742B2—Dickinson sandy loam, loamy substratum, 1 to 5 percent slopes, eroded. This gently sloping, well drained soil is on uplands and outwash plains. Individual areas are long and narrow or irregular in shape and range from 5 to 35 acres in size.

Typically, the surface layer is mixed very dark grayish brown and brown, very friable sandy loam about 9 inches thick. The subsoil is about 45 inches thick. It is very friable. The upper part is brown and dark yellowish brown sandy loam. The next part is yellowish brown sandy loam. The lower part is yellowish brown, mottled sand. The substratum to a depth of 60 inches is light gray, mottled, friable loam. In places it is below a depth of 60 inches. In a few places the upper part of the subsoil contains more sand. In a few areas the surface layer is thicker.

Included with this soil in mapping are small areas of somewhat poorly drained soils. These soils are in the lower landscape positions. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Dickinson soil at a rapid rate and through the substratum at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is strongly acid to neutral. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to local roads and streets. It is well suited to dwellings and poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, and small grain, drought, soil blowing, and erosion are hazards. Contour farming and a system of conservation tillage that leaves crop residue on the surface after planting conserve moisture and help to prevent excessive soil losses. Cover crops and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the subsoil may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIe.

742C2—Dickinson sandy loam, loamy substratum, 5 to 10 percent slopes, eroded. This sloping, well drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is mixed dark brown and yellowish brown, very friable sandy loam about 8 inches thick. The subsoil is very friable sandy loam about 40 inches thick. The upper part is yellowish brown, and the lower part is strong brown and mottled. The substratum to a depth of 60 inches is yellowish brown, mottled, friable loam. In some places the loamy material in the lower part of the subsoil is below a depth of 60 inches. In other places the upper part of the subsoil contains more sand.

Included with this soil in mapping are small areas of somewhat poorly drained soils. These soils are in the lower landscape positions. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Dickinson soil at a rapid rate and through the substratum at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is moderate. Organic matter content also is moderate. The subsoil is medium acid and slightly acid. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to local roads and streets. It is well suited to dwellings and poorly suited to septic tank absorption fields.

In areas used for corn, soybeans, and small grain, drought, soil blowing, and erosion are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, and terraces

combined with a cropping sequence that includes 2 years of row crops, 1 year of small grain, and 1 year of grasses and legumes conserve moisture and help to prevent excessive soil losses. Winter cover crops and field windbreaks help to control soil blowing. Irrigation commonly supplies additional water.

If this soil is used as a septic tank absorption field, the poor filtering capacity of the subsoil may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

Frost action is a hazard if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to prevent the damage caused by frost action.

The land capability classification is IIIe.

761D—Eleva fine sandy loam, 7 to 15 percent slopes. This strongly sloping, somewhat excessively drained soil is on side slopes along upland drainageways. Individual areas are irregular in shape and range from 3 to 15 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 4 inches thick. The subsoil is about 28 inches thick. It is very friable. The upper part is dark yellowish brown and yellowish brown fine sandy loam. The lower part is brown sandy loam and fine sandy loam. Yellowish brown, weakly cemented sandstone bedrock is at a depth of about 32 inches. It is underlain by very pale brown, strongly cemented sandstone. In some areas the soil contains more sand. In some places it is deeper over sandstone bedrock, and in others it is shallower. In a few places the content of clay is higher.

Included with this soil in mapping are small areas of the well drained Billett and Martinsville soils. These soils are more than 60 inches deep over bedrock and are downslope from the Eleva soil. They make up 5 to 10 percent of the unit.

Water and air move through the Eleva soil at a moderately rapid rate. Surface runoff is medium. Available water capacity is low. Organic matter content is moderately low. The subsoil is neutral to medium acid. Root growth is restricted by the sandstone bedrock at a depth of 20 to 40 inches. The potential for frost action is moderate.

Most areas are pastured. This soil is poorly suited to pasture and cultivated crops. It is moderately suited to woodland wildlife habitat and to dwellings and local roads and streets. It is poorly suited to septic tank absorption fields.

In areas used for hay and pasture, erosion and drought are hazards, particularly during periods when the plants are being established. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion. Planting drought-resistant grasses and legumes helps to establish a pasture.

If this soil is used for cultivated crops, erosion and drought are hazards. A system of conservation tillage that leaves crop residue on the surface after planting, contour farming, terraces, and a cropping sequence dominated by pasture and hay help to control erosion. Maintaining a mulch on the surface conserves moisture. Irrigation can supply supplemental water.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

The depth to bedrock is a limitation if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The slope is a limitation if this soil is used as a site for dwellings. Also, the depth to bedrock is a limitation on sites for dwellings with basements. The soft bedrock can be excavated with some difficulty. Grading may be needed when sites for dwellings are prepared. Sediment trap basins can be used during construction to prevent the sedimentation of surface water. Frost action and slope are limitations on sites for local roads and streets. Strengthening or replacing the base material helps to prevent the damage caused by frost action. Grading to a more favorable slope may be needed. Mulching and seeding roadbanks help to control erosion.

The land capability classification is IVe.

761F—Eleva fine sandy loam, 15 to 35 percent slopes. This moderately steep and steep, somewhat excessively drained soil is on side slopes along upland drainageways. Individual areas are irregular in shape and range from 5 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 4 inches thick. The subsoil is about 28 inches thick. It is very friable. The upper part is dark yellowish brown fine sandy loam. The next part is yellowish brown fine sandy loam. The lower part is brownish yellow sand. Light gray, weakly cemented sandstone bedrock is at a depth of about 32 inches. It is underlain by more strongly cemented sandstone. In some areas the soil contains more sand. In some places it is deeper over sandstone bedrock, and in others it is shallower. In a few places the content of clay is higher.

Included with this soil in mapping are small areas of the well drained Billett and Martinsville soils. These soils are less sloping than the Eleva soil. They are more than 60 inches deep over bedrock. They make up 5 to 10 percent of the unit.

Water and air move through the Eleva soil at a moderately rapid rate. Surface runoff is medium. Available water capacity is low. Organic matter content is moderately low. The subsoil is medium acid and strongly acid. Root growth is restricted by the sandstone bedrock at a depth of 20 to 40 inches. The potential for frost action is moderate.

Most areas are used as habitat for woodland wildlife. This soil is poorly suited to pasture and moderately suited to woodland wildlife habitat. It is unsuited to cultivated crops and to dwellings and septic tank absorption fields because of the slope.

In areas used for pasture, erosion and drought are hazards during periods when the plants are being established. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion. Planting drought-resistant grasses and legumes helps to establish a pasture.

In the areas used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

The land capability classification is VIe.

776—Comfrey loam. This nearly level, poorly drained soil is on flood plains. It is occasionally flooded for brief periods from April to June. Individual areas are linear or irregular in shape and range from 10 to 200 acres in size.

Typically, the surface layer is black, friable loam about 8 inches thick. The subsurface layer is friable loam about 26 inches thick. The upper part is black. The next part is black and mottled. The lower part is very dark gray and mottled. The upper part of the substratum is dark gray, mottled, friable loam. The lower part to a depth of 60 inches is grayish brown, mottled, very friable loamy sand. In some places the dark surface soil is more than 36 or less than 24 inches thick. In other places it contains more sand. In some areas the soil contains less sand and has a seasonal high water table at a depth of more than 3 feet.

Included with this soil in mapping are small areas of the very poorly drained Comfrey soils that are ponded. These soils are in old stream channels. They make up 5 to 10 percent of the unit.

Water and air move through the Comfrey soil at a moderate rate. Surface runoff is very slow in cultivated areas. A seasonal high water table is within 3.0 feet of the surface during the spring. Available water capacity is high. Organic matter content also is high. The subsurface layer is neutral. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to dwellings and septic tank absorption fields because of the flooding and the seasonal high water table.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system may be needed. Subsurface drains and ditches help to remove excess water. Levees and diversions help to prevent the damage caused by flooding. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth.

The seasonal high water table, frost action, and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

777—Adrian muck. This nearly level, very poorly drained soil is in depressions on outwash plains. It is subject to ponding from November to May. Individual areas are oval and range from 3 to 30 acres in size.

Typically, the upper part of this soil is black, friable muck about 34 inches thick. The muck contains small amounts of partially decomposed plant material. The substratum to a depth of 60 inches is grayish brown, loose loamy sand. In some places the muck is thicker. In other places the substratum contains more clay.

Included with this soil in mapping are small areas of the poorly drained Comfrey and somewhat poorly drained Hoopeston soils and small areas of Gilford soils. These mineral soils are in the slightly higher landscape positions. They make up 5 to 10 percent of the unit.

Water and air move through the upper part of the Adrian soil at a moderately slow rate and through the substratum at a moderately rapid rate. Surface runoff is very slow. A seasonal high water table is 1.0 foot above the surface to 1.0 foot below during the spring. Available water capacity is very high. Organic matter content also is very high. The soil is neutral throughout. The potential for frost action is high. The soil is unstable. It is highly compressible when supporting loads and is subject to subsidence after it is drained.

Most areas support wetland plants. This soil is well suited to wetland wildlife habitat. It is unsuited to dwellings, septic tank absorption fields, and local roads and streets because of the frequent ponding and low strength.

This soil provides good habitat for wetland wildlife. The plant species that occur naturally furnish good food and cover for wetland wildlife, such as ducks, muskrats, mink, and shore birds. The habitat should be protected from fire and grazing. In areas that do not have open water, excavating 2 to 4 feet of soil enhances the habitat if about two-thirds of the area remains vegetated.

The land capability classification is Vw.

779B—Chelsea fine sand, 1 to 7 percent slopes. This gently sloping, excessively drained soil is on uplands. Individual areas are irregular in shape and range from 5 to 120 acres in size.

Typically, the surface layer is very dark grayish brown, very friable fine sand about 4 inches thick. The subsurface layer is fine sand about 32 inches thick. The upper part is dark yellowish brown and very friable. The lower part is yellowish brown and loose. The subsoil to a depth of 60 inches is yellowish brown, loose fine sand. It has thin bands of strong brown, very friable loamy sand. In some places it does not have these bands. In other places the bands are thicker. In a few places the subsoil contains coarser sand.

Included with this soil in mapping are small areas of the well drained Ayr sandy loam, the well drained Miami fine sandy loam, the somewhat poorly drained Morocco soils, and the poorly drained Orio soils. Ayr, Miami, and Orio soils contain more clay and less sand in the subsoil than the Chelsea soil. Ayr and Miami soils are downslope from the Chelsea soil. Morocco soils are in the lower landscape positions. Orio soils are in depressions. Included soils make up 2 to 5 percent of the unit.

Water and air move through the Chelsea soil at a rapid rate. Surface runoff is slow in cultivated areas. Available water capacity is low. Organic matter content also is low. The subsoil is neutral.

Most areas are cultivated. This soil is poorly suited to cultivated crops, hay, pasture, deciduous woodland, and woodland wildlife habitat and to septic tank absorption fields and most kinds of recreational development. It is moderately suited to coniferous woodland and well suited to dwellings and local roads and streets. If irrigated, it is moderately suited to specialty crops, such as vegetables and melons.

In areas used for corn, soybeans, small grain, and specialty crops, soil blowing and drought are hazards. Contour farming and a system of conservation tillage that leaves crop residue on the surface after planting help to control soil blowing and conserve moisture. Winter cover crops and field windbreaks also help to control soil blowing. Irrigation commonly supplies additional water.

If this soil is used for woodland, seedling mortality and plant competition are the main management problems. Planting drought-resistant species helps to control seedling mortality. Plant competition can be controlled by harvesting mature trees, cutting cull trees, and thinning and weeding. Planting seedlings on the contour and in an established cover crop helps to prevent excessive soil losses while the trees are being established.

If this soil is used as a septic tank absorption field, the poor filtering capacity may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The land capability classification is IVs.

779D—Chelsea fine sand, 7 to 20 percent slopes. This sloping to moderately steep, excessively drained soil is on upland dunes. Individual areas are long and narrow, crescent shaped, or irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is very dark gray, very friable fine sand about 3 inches thick. The subsurface layer is loose fine sand about 37 inches thick. The upper part is dark brown. The next part is dark yellowish brown. The lower part is brownish yellow. The subsoil to a depth of 60 inches is brownish yellow, loose sand. It has thin bands of dark brown, very friable loamy sand. In some places it does not have these bands. In other places the bands are thick. In a few places the subsoil contains coarser sand.

Included with this soil in mapping are small areas of the well drained Ayr and Miami soils, the somewhat poorly drained Morocco soils, and the poorly drained Orio soils. Ayr, Miami, and Orio soils contain more clay and less sand in the subsoil than the Chelsea soil. Ayr and Miami soils are downslope from the Chelsea soil. Morocco soils are in the lower landscape positions. Orio soils are in depressions. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Chelsea soil at a rapid rate. Surface runoff is slow. Available water capacity is low. Organic matter content also is low. The subsoil is strongly acid and medium acid.

Most areas are wooded. This soil is moderately suited to coniferous woodland. It is poorly suited to deciduous woodland, pasture, recreational development, and septic tank absorption fields. It is moderately suited to dwellings and local roads and streets. It is unsuited to cultivated crops because of droughtiness and slope.

In areas used for woodland, seedling mortality and plant competition are the main management problems. Planting drought-resistant species helps to control seedling mortality. Plant competition can be controlled by harvesting mature trees, cutting cull trees, and thinning and weeding. Planting seedlings on the contour and in an established cover crop helps to prevent excessive soil losses while the trees are being established.

If this soil is used as a septic tank absorption field, the poor filtering capacity may result in the pollution of ground water. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The slope is a limitation if this soil is used as a site for dwellings or local roads and streets. Alteration of the slope by cutting and filling, however, helps to overcome this limitation.

The land capability classification is VIs.

779F—Chelsea fine sand, 20 to 35 percent slopes. This steep, excessively drained soil is on upland dunes. Individual areas are long and narrow, crescent shaped, or irregular in shape and range from 5 to 15 acres in size.

Typically, the surface layer is very dark gray, very friable fine sand about 5 inches thick. The subsurface layer is loose fine sand about 33 inches thick. The upper part is dark yellowish brown. The lower part is yellowish brown. The subsoil to a depth of 60 inches is light yellowish brown, loose fine sand. It has thin bands of dark brown, very friable loamy sand. In some places it does not have these bands. In other places it contains coarser sand.

Water and air move through this soil at a rapid rate. Surface runoff is medium. Available water capacity is low. Organic matter content also is low. The subsoil is medium acid and slightly acid.

Most areas are used for deciduous and coniferous woodland. This soil is poorly suited to deciduous woodland and moderately suited to coniferous woodland. It is unsuited to cultivated crops and to septic tank absorption fields, dwellings, and most types of recreational development because of the steep slope.

In the areas used for woodland, the erosion hazard, the equipment limitation, seedling mortality, and plant competition are the main management problems. Woodland should be protected from fire and grazing. Building logging roads and skid trails on or as near the contour as possible, skidding logs or trees uphill with a cable and winch, diverting surface water from logging roads and skid trails with water bars, establishing grass firebreaks, and seeding all bare areas to grass or a grass-legume mixture after logging has been completed help to control erosion. In the bare areas the trees should be planted on the contour if a mechanical tree planter is used. Machinery should be used only during periods when the soil is firm enough to support the equipment. Otherwise, ruts are likely to form. Safety precautions when working with machinery and roll bars on skidding equipment are needed. Logs should be skidded uphill with a cable and winch. Equipment could overturn if the uphill wheels hit flat rocks or roots. Planting in furrows, selecting larger plants, or mulching helps to overcome seedling mortality. In some areas replanting is needed. Plant competition can be controlled by applying chemicals.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

The steep slope and the sandy surface texture are problems in areas used for paths and trails. In the areas that are subject to intensive foot traffic, mulching helps to control erosion. Paths and trails should be established on the contour or across the slope instead of up and down the slope.

The land capability classification is VIIs.

781B—Friesland fine sandy loam, 1 to 4 percent slopes. This nearly level, well drained soil is on uplands. Individual areas are oval or irregular in shape and range from 3 to 30 acres in size.

Typically, the surface layer is very dark gray, friable fine sandy loam about 7 inches thick. The subsurface layer is about 11 inches thick. It is friable. The upper part is very dark gray fine sandy loam. The lower part is dark brown loam. The subsoil extends to a depth of 60 inches. It is friable. The upper part is dark yellowish brown loam. The next part is dark yellowish brown silt loam. The lower part is yellowish brown, mottled silt loam. In some places the dark surface soil is less than 10 inches thick. In other places the soil does not have silt loam in the lower part of the subsoil and has a loam substratum high in content of lime. In a few places the subsoil contains more sand and less clay.

Included with this soil in mapping are small areas of the excessively drained Chelsea and somewhat poorly drained La Hogue soils. Chelsea soils are sandy and are on dune-shaped ridges. La Hogue soils are on the slightly lower parts of the landscape. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Friesland soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. The subsoil is medium acid to neutral. The potential for frost action is moderate.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture and to septic tank absorption fields. It is well suited to dwellings and poorly suited to local roads and streets.

In areas used for corn, soybeans, and small grain, soil blowing and water erosion are hazards. A system of conservation tillage that leaves crop residue on the surface after planting and contour farming or terraces help to prevent excessive soil losses. Winter cover crops and field windbreaks help to control soil blowing.

The restricted permeability is a limitation if this soil is used as a septic tank absorption field. Enlarging the absorption field, however, helps to overcome this limitation.

Low strength and frost action are limitations if this soil is used as a site for local roads and streets. Strengthening or replacing the base material, however, helps to overcome these limitations.

The land capability classification is IIe.

802A—Orthents, loamy, nearly level. These soils are in areas that have been modified by filling and excavating. Soil borings indicate that the soil material varies widely and does not occur in a consistent pattern.

As a result, the soils cannot be mapped at the series level. Slope is mainly 0 to 3 percent. Individual areas are rectangular and range from 5 to 600 acres in size.

The mixed soil material in this unit is sandy loam to clay loam. It commonly is 2 to more than 5 feet thick. In some areas sand and gravel and refuse and other nonsoil material are incorporated into the soils. Some areas are sanitary landfills or highway interchanges.

Included with these soils in mapping are the well drained Dakota and Jasper, somewhat poorly drained Nachusa, and poorly drained Clyde soils. These included soils are in areas that have not been disturbed. In some areas the slope is as much as 15 percent. Included soils make up less than 15 percent of the unit.

Air and water movement through these soils varies because of compaction by heavy equipment and because of the diverse soil textures. Available water capacity is moderate. Organic matter content and natural fertility are low.

Most areas are used for industrial development, small commercial buildings, and recreational facilities. These soils are moderately suited to small commercial buildings, recreational facilities, wildlife habitat, and woodland. They are poorly suited to septic tank absorption fields and dwellings.

In some areas these soils are subject to settling. The base material should be thoroughly mixed and compacted when buildings are constructed on these soils. Dangerous gases may be released in areas where the soils are mixed with refuse. Covering an area with impervious material helps to prevent leakage of the gases. Removing a minimum of vegetation, mulching, and promptly reestablishing vegetation help to control erosion during construction. Seeding a grass-legume mixture that is suited to a wide range of soil conditions helps to establish desirable vegetation. Applications of fertilizer, lime, and organic residue are needed. Undesirable woody plants should be replaced by desirable trees and shrubs.

No land capability classification is assigned.

864—Pits, quarries. This map unit consists of excavations from which dolomitic limestone has been removed and the disturbed areas around the excavations. The pits are in areas where limestone is close to the surface. They are 4 to 350 acres in size.

The bottom and sides of the pits are limestone bedrock. The excavations are 20 to 150 feet deep. The areas support little or no vegetation. The pits that are filled with water are indicated as water on the soil maps.

Included in this unit in mapping are small areas of Orthents, loamy, which support vegetation. These soils are in areas where mine spoil has been mixed with the material from around the pit. They make up 5 to 15 percent of the unit.

Most areas are mined. Some are used for recreational development. This map unit is moderately suited to recreational uses. Stocking the water-filled pits with fish and planting trees enhance the recreational areas. Topdressing and grading the disturbed areas help to establish vegetation.

No land capability classification is assigned.

865—Pits, gravel. This map unit consists of excavations from which gravel and sand have been removed and the disturbed areas around the excavations. The pits are in outwash areas and on stream terraces. They are 5 to 50 acres in size.

The material in this map unit is sandy and gravelly. The excavations are 10 to 80 feet deep. The areas support little or no vegetation. The pits that are filled with water are indicated as water on the soil maps.

Included in this unit in mapping are small areas of Orthents, loamy, which support vegetation. These soils are in areas where mine spoil has been mixed with the material from around the pit. They make up less than 15 percent of the unit.

Most areas are used for recreational development. Some are mined. This map unit is moderately suited to recreational facilities. It is poorly suited to sanitary landfills. Stocking the water-filled pits with fish and planting trees enhance the recreational areas. Topdressing and grading the disturbed areas help to establish vegetation.

No land capability classification is assigned.

3067—Harpster silty clay loam, occasionally flooded. This nearly level, poorly drained soil is on lake plains. It is occasionally flooded or ponded for brief periods from March to June. Individual areas are irregular in shape and range from 5 to 2,000 acres in size.

Typically, the surface layer is black, friable, mildly alkaline silty clay loam about 8 inches thick. The subsurface layer is black, friable, mildly alkaline silty clay loam about 6 inches thick. The subsoil is friable, mildly alkaline silty clay loam about 27 inches thick. The upper part is dark gray. The lower part is gray. The substratum to a depth of 60 inches is light olive gray, friable, mildly alkaline silt loam. In places more sand is throughout the profile. In a few places the substratum has sandy or gravelly layers.

Included with this soil in mapping are small areas of Hartsburg and Selma soils. These soils are in positions on the landscape similar to those of the Harpster soil. Hartsburg soils are not alkaline within a depth of 15 inches. Selma soils are not alkaline within a depth of 40 inches. Included soils make up 2 to 10 percent of the unit.

Water and air move through the Harpster soil at a moderate rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is very high. Organic matter content is high. Reaction is mildly alkaline throughout the

profile. The surface layer is friable but becomes hard and cloddy if tilled when wet. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is well suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is unsuited to septic tank absorption fields and dwellings because of the seasonal high water table and the flooding.

This soil is sufficiently drained for corn, soybeans, and small grain. Measures that maintain the drainage system are needed. Subsurface drains and ditches remove excess water. Returning crop residue to the soil helps to prevent surface crusting and maintains tilth. The high content of lime decreases the availability of applied phosphorus and potassium. As a result, additional applications of phosphorus and potassium may be needed.

The seasonal high water table, low strength, and flooding are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

4200—Orio mucky sandy loam, ponded. This nearly level, very poorly drained soil is in depressions on outwash plains. It is ponded for prolonged periods. Individual areas are irregular in shape and range from 2 to 80 acres in size.

Typically, the surface layer is black, friable mucky sandy loam about 11 inches thick. The subsurface layer is about 8 inches of dark grayish brown, mottled, very friable sandy loam and loamy sand. The subsoil is about 22 inches thick. It is mottled. The upper part is dark gray, friable clay loam. The next part is very dark gray, friable sandy clay loam. The lower part is olive gray, very friable loamy sand. The substratum to a depth of 60 inches is olive brown, loose sand. In some places the subsoil contains less clay. In other places it is thicker and contains more clay in the lower part. In a few places the substratum has thin layers of sandy clay loam or sandy loam.

Included with this soil in mapping are small areas of the somewhat poorly drained Hoopeston soils. These soils contain more sand and less clay in the subsoil than the Orio soil. They are in the slightly higher landscape positions. They make up 2 to 5 percent of the unit.

Water and air move through the upper part of the Orio soil at a moderately slow rate and through the substratum at a rapid rate. Surface runoff is very slow or ponded. A seasonal high water table is 0.5 foot above the surface to 1.0 foot below during most of the growing season. Available water capacity is high. Organic matter content is very high. The subsoil is medium acid to neutral. The shrink-swell potential and the potential for frost action are moderate.

Most areas support wetland plants. This soil is well suited to wetland wildlife habitat. It is unsuited to dwellings, septic tank absorption fields, and local roads and streets because of the prolonged ponding.

This soil provides good habitat for wetland wildlife. The plant species which occur naturally furnish good food and cover for wetland wildlife, such as ducks, muskrats, mink, and shore birds. The habitat should be protected from fire and grazing. In areas that do not have open water, excavating 2 to 4 feet of soil enhances the habitat if about two-thirds of the area remains vegetated.

The land capability classification is Vw.

4776—Comfrey silt loam, ponded. This nearly level, very poorly drained soil is on flood plains. It is frequently flooded and ponded for long periods from April to July. Individual areas are generally linear and range from 2 to 80 acres in size.

Typically, the surface layer is black, friable silt loam about 11 inches thick. The subsurface layer is black, friable loam about 17 inches thick. The substratum to a depth of 60 inches is very dark gray, mottled, friable loam. It has depositional strata in the upper part and has thin layers of sandy loam, loamy sand, and sand in the lower part. In some places the surface layer is light colored. In other places the soil contains more sand throughout. In a few places this alluvial soil is better drained and is only occasionally flooded. In some areas the surface layer and subsurface layer are thinner.

Included with this soil in mapping are small areas of Adrian soils and the poorly drained Millington soils. The upper part of Adrian soils is muck. Millington soils are calcareous throughout. Included soils are in positions on the landscape similar to those of the Comfrey soil. They make up 5 to 15 percent of the unit.

Water and air move through the Comfrey soil at a moderate rate. Surface runoff is very slow or ponded. A seasonal high water table is 1.0 foot above the surface to 1.0 foot below in the spring and early in summer. Available water capacity is high. Organic matter content is very high. The subsurface layer is neutral or mildly alkaline. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas support wetland plants. This soil is well suited to wetland wildlife habitat. It is unsuited to dwellings, septic tank absorption fields, and local roads and streets because of the prolonged ponding and the frequent flooding.

This soil provides good habitat for wetland wildlife. The plant species which occur naturally furnish good food and cover for wetland wildlife, such as ducks, muskrats, mink, and shore birds. The habitat should be protected from fire and grazing. In areas that do not have open water, excavating 2 to 4 feet of soil enhances the habitat if about two-thirds of the area remains vegetated.

The land capability classification is VIw.

6206—Thorp Variant, silt loam. This nearly level, poorly drained soil is in depressions on uplands. It is ponded for brief periods from March to June. Individual areas are irregular in shape and range from 3 to 25 acres in size.

Typically, the surface layer is black and very dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is grayish brown, friable silt loam about 6 inches thick (fig. 8). The subsoil extends to a depth of 60 inches. It is mottled. The upper part is dark gray, firm clay loam and loam. The next part is dark gray, friable sandy loam. The lower part is gray, friable clay loam. In some places the subsoil does not have a layer of sandy loam. In other places the lower part of the subsoil is sandy loam or loamy sand. In a few places the depth to a seasonal high water table is more than 2 feet.

Included with this soil in mapping are small areas that are ponded most of the year. These areas make up 5 to 15 percent of the unit.

Water and air move through the Thorp Variant soil at a slow rate. Surface runoff is slow to ponded in cultivated areas. A seasonal high water table is 0.5 foot above the surface to 2.0 feet below during the spring. Available water capacity is high. Organic matter content is moderate. The subsoil is slightly acid to strongly acid. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas are cultivated. This soil is moderately suited to cultivated crops, hay, and pasture. It is poorly suited to local roads and streets. It is generally unsuited to dwellings and septic tank absorption fields because of the ponding.

This soil is sufficiently drained for corn, soybeans, and small grain. It is drained by a combination of subsurface drains and surface inlets or ditches. Measures that maintain the drainage system are needed. Returning crop residue to the soil helps to prevent surface crusting.

The seasonal high water table and frost action are limitations if this soil is used as a site for local roads and streets. Providing open ditches, which remove excess water, strengthening or replacing the base material, and raising the roadbed with fill material help to overcome these limitations.

The land capability classification is IIw.

6397D—Boone Variant, loamy fine sand, 7 to 15 percent slopes. This strongly sloping, excessively drained soil is on uplands. Individual areas are irregular in shape and range from 3 to 20 acres in size.

Typically, the surface layer is very dark grayish brown, very friable loamy fine sand about 6 inches thick. The subsoil is about 12 inches thick. It is yellowish brown and very friable. The upper part is loamy fine sand, and the lower part is fine sand. Mottled yellowish brown and light gray fractured sandstone bedrock is at a depth of about 18 inches. In some places gravel is on the surface. In other places the soil is more than 20 inches deep over

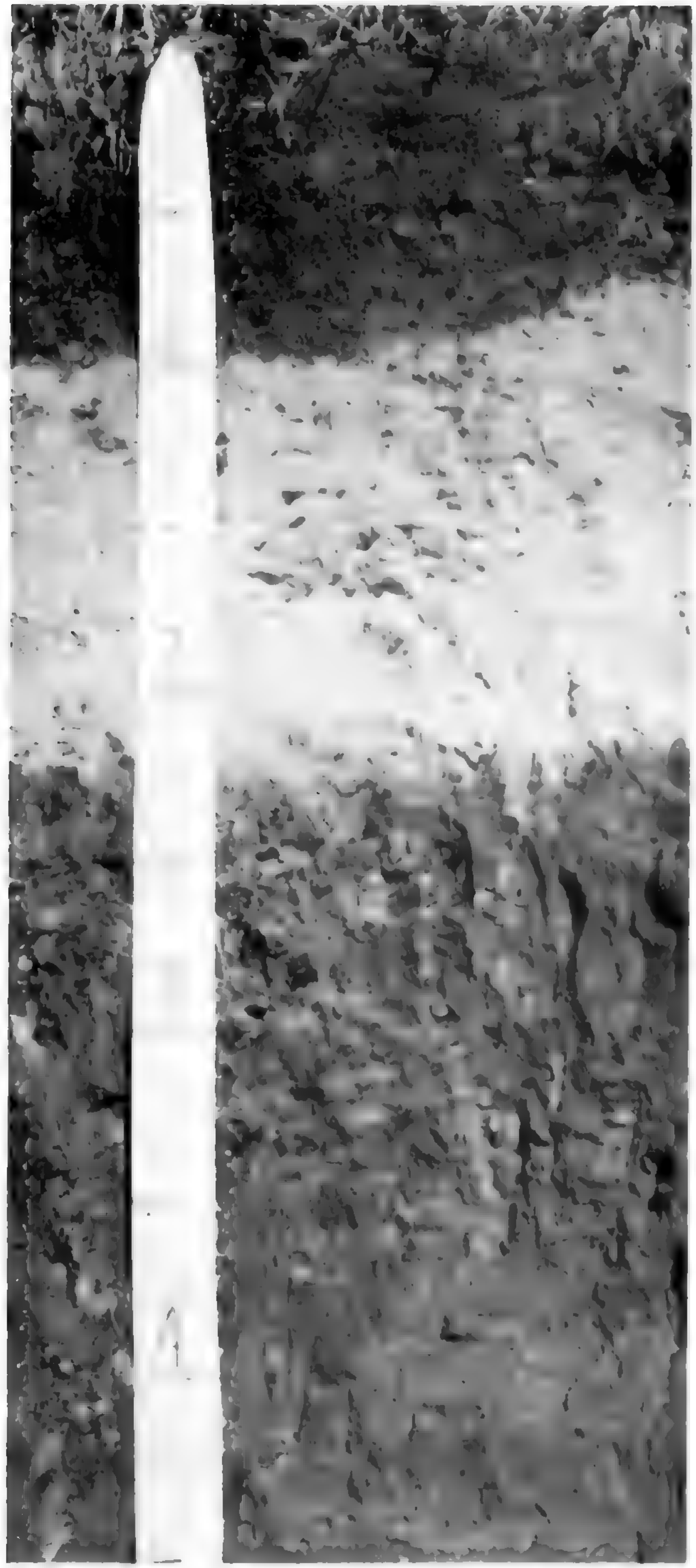


Figure 8.—Profile of Thorp Variant, silt loam. The subsurface layer is light colored. Depth is marked in feet.

sandstone. In a few places it contains more clay and is more than 20 inches deep over sandstone.

Included with this soil in mapping are the well drained Martinsville and poorly drained Comfrey soils. These soils are more than 60 inches deep over bedrock. They contain more clay than the Boone Variant soil. Also, Martinsville soils are higher on the landscape. Comfrey soils are in narrow drainageways. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Boone Variant soil at a rapid rate. Surface runoff is medium. Available water capacity is very low. Organic matter content is low. The subsoil is very strongly acid. Root growth is restricted by the sandstone bedrock within a depth of 20 inches.

Most areas are pastured. This soil is poorly suited to pasture, to woodland wildlife habitat, to dwellings with basements, and to septic tank absorption fields. It is moderately suited to dwellings without basements and to local roads and streets.

In the areas used for pasture, erosion and drought are hazards during periods when the plants are being established. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion. Planting drought-resistant grasses and legumes helps to establish a pasture.

If this soil is used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

The depth to bedrock is a limitation if this soil is used as a septic tank absorption field. A septic tank system functions satisfactorily if a sealed sand filter and a disinfection tank are installed.

The depth to bedrock and the slope are limitations if this soil is used as a site for dwellings. Grading may be needed when sites for dwellings are prepared. The soft bedrock can be excavated with some difficulty. Sediment trap basins can be used during construction to prevent the sedimentation of surface water. The slope and the depth to bedrock are limitations on sites for local roads and streets. Grading to a more favorable slope may be needed. Grading is difficult, however, because of the shallow bedrock. The soft bedrock can generally be excavated with heavy equipment. Blasting with explosives may be needed. Mulching and seeding roadbanks help to control erosion.

The land capability classification is VIIs.

6397F—Boone Variant, loamy fine sand, 15 to 35 percent slopes. This moderately steep and steep, excessively drained soil is along upland drainageways. Individual areas are irregular in shape and range from 3 to 15 acres in size.

Typically, the surface layer is very dark gray, very friable loamy fine sand about 3 inches thick. The subsoil is very friable fine sand about 15 inches thick. The upper part is very dark grayish brown, and the lower part is yellowish brown. Fractured sandstone bedrock is at a depth of about 18 inches. In some places gravel is on the surface. In other places the soil is more than 20 inches deep over sandstone. In a few places it contains more clay and is more than 20 inches deep over bedrock.

Included with this soil in mapping are the poorly drained Comfrey and well drained Martinsville soils. These soils are more than 60 inches deep over bedrock. Comfrey soils are in drainageways. Martinsville soils are upslope from the Boone Variant soil. Included soils make up 5 to 10 percent of the unit.

Water and air move through the Boone Variant soil at a rapid rate. Surface runoff is medium. Available water capacity is very low. Organic matter content is low. The subsoil is very strongly acid. Root growth is restricted by the sandstone bedrock within a depth of 20 inches.

Most areas are used for pasture. Some are used for woodland wildlife habitat. This soil is poorly suited to pasture and to woodland wildlife habitat. It is unsuited to dwellings and septic tank absorption fields because of the slope.

In the areas used for pasture, erosion and drought are hazards during periods when the plants are being established. Pasture rotation, timely deferment of grazing, and applications of fertilizer help to keep the pasture and the soil in good condition and help to control erosion. Planting drought-resistant grasses and legumes helps to establish a pasture.

In the areas used for woodland wildlife habitat, measures that maintain the naturally occurring plant species are needed. Establishing wildlife food plots and additional cover is difficult because of the droughtiness and the low fertility. Planting drought-resistant species helps to establish wildlife cover. The habitat should be protected from fire and grazing.

The land capability classification is VIIs.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. Because the supply of high quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cropland,

pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber or is available for those uses. The soil qualities, growing season, and moisture supply are those needed for a well managed soil economically to produce a sustained high yield of crops. Prime farmland produces the highest yields with minimum input of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 5 percent. More detailed information about the criteria for prime farmland is available at local offices of the Soil Conservation Service.

About 402,250 acres throughout Lee County, or nearly 86 percent of the total acreage, meets the requirements for prime farmland. Associations 1, 2, 3, 4, 7, 8, 9, 10, and 11, which are described under the heading "General Soil Map Units," have the highest percentage of prime farmland. About 362,000 acres of this land is used for crops, mainly corn and soybeans, which account for most of the local farm income each year.

A recent trend in land use in some parts of the county has been the loss of some prime farmland to industrial and urban uses (fig. 9). The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

The map units in Lee County that meet the requirements for prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Some map units meet the requirements for prime farmland only in areas where the soil is drained or irrigated. In table 5, the need for measures that overcome these limitations is indicated in parentheses

Figure 9.—Encroachment of urban development onto prime farmland in an area of well drained Parr silt loam, 2 to 5 percent slopes.

after the name of these map units. Onsite evaluation is needed to determine whether or not a specific area of the soil is adequately drained or irrigated. In Lee County the naturally wet soils that are listed in table 5 generally have been adequately drained.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

The primary crops in Lee County are corn and soybeans. The main close-growing crops are wheat and oats. In 1978, corn was grown on about 220,027 acres and soybeans on 109,783 acres. About 10,824 acres was used for hay and 11,429 acres for pasture. Vegetable crops, primarily sweet corn, were grown on more than 8,000 acres (*14*). The acreage used for soybeans has increased significantly in recent years. The acreage used for corn and vegetable crops has increased to a lesser extent. The acreage used for oats and hay has decreased.

The soils in Lee County have the potential for increased crop production. This soil survey can serve as a valuable guide to the latest management techniques that increase food and fiber production. It can also provide information about land use planning. Land use planners and others can use this information in making decisions that will lead to orderly growth and development of urban and rural areas.

The chief management needs in the areas used for crops and pasture are measures that help to control erosion and soil blowing, remove excess water, help to overcome droughtiness, and maintain or improve fertility and tilth.

Soil erosion is a major problem on about 50 percent of the cropland and pasture in Lee County (*5*). Sheet erosion, or loss of the surface layer, is damaging for three reasons. First, as the surface layer is eroded away and the subsoil is incorporated into the plow layer, the productivity of most soils is reduced. Loss of the surface layer is especially damaging in areas where soils are shallow or moderately deep to layers that restrict root penetration. Such layers include the bedrock underlying Rockton, Sogn, and Whalan soils. Second, erosion results in deterioration of tilth in the surface soil and reduces the rate of water intake. In severely eroded areas preparing a good seedbed is difficult because the clayey surface soil tends to be cloddy if worked when wet. Also, severely eroded soils tend to crust after hard rains. As a result, the runoff rate is increased. Third, erosion can result in sedimentation of streams, lakes,

rivers, and road ditches. Sediment pollution deteriorates water quality for municipal and recreation uses and for fish and wildlife. Removing the sediment generally is expensive.

Providing an adequate plant cover and reducing the length of slopes help to control erosion and soil blowing. These measures also reduce the runoff rate and increase the rate of water infiltration. A cropping system that keeps a plant cover and crop residue on the surface during critical rainfall periods and includes grasses and legumes helps to prevent excessive soil losses and maintains productivity.

Terraces, diversions, contour farming, and contour stripcropping reduce the runoff rate and help to control erosion. In areas where slopes are short and irregular, such as areas of La Rose and Parr soils, contour farming, a cropping sequence that includes grasses and legumes, and a system of conservation tillage that leaves crop residue on the surface after planting help to control erosion. Grassed waterways and erosion-control structures help to remove excess water at a nonerosive velocity (fig. 10).

Soil blowing is a problem on about 10 percent of the cropland in the county. It is a hazard in areas of Billett, Chelsea, Dakota, Dickinson, Sparta, and other sandy soils. Maintaining an adequate plant cover, leaving crop

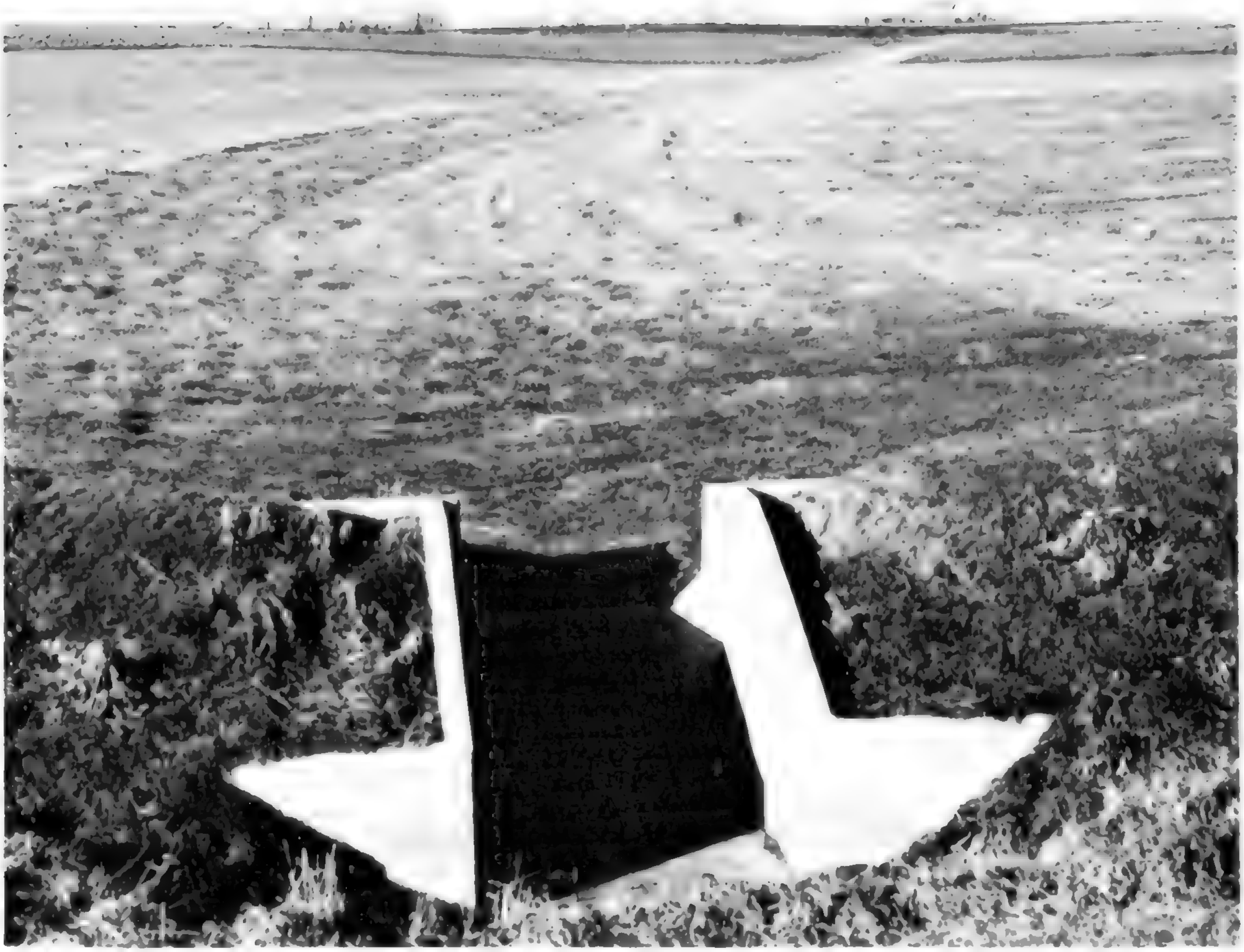


Figure 10.—A newly established grassed waterway and grade stabilization structure in an area of Sable silty clay loam.

residue on the surface, and keeping the surface soil rough help to control soil blowing. Windbreaks of suitable trees or shrubs also help to control soil blowing.

Further information about the erosion-control measures suitable for each kind of soil is provided in the Technical Guide, available in local offices of the Soil Conservation Service.

Artificial drainage has improved about 30 percent of the acreage used for crops and pasture in the county (*5*). Unless a drainage system is maintained, poorly drained soils are naturally so wet that the production of crops commonly grown in the county generally is not feasible. Drummer, Harpster, Sable, and Thorp Variant soils are examples. Unless drained, somewhat poorly drained soils are wet enough in some years for crop growth and productivity to be reduced. Examples are Muscatine, Flanagan, and Elburn soils.

The design of surface and subsurface drainage systems varies with the kind of soil. On many soils subsurface drains alone are inadequate. In some areas of very poorly drained and poorly drained soils, a combination of surface ditches and subsurface drains is needed. Gilford and Houghton soils are examples. In slowly permeable soils, such as Denny and Thorp Variant soils, surface inlets and subsurface drains are needed to remove excess water. Moderately permeable soils, such as Sable, Drummer, and Muscatine soils, can be adequately drained by subsurface drains if suitable outlets are available.

Further information about the drainage system suitable for each kind of soil is provided in the Technical Guide, available in local offices of the Soil Conservation Service.

Droughtiness limits the productivity of some of the soils used for crops in the county. The physical composition of some soils limits the amount of water available to plants during dry periods. Chelsea and Sparta soils are examples. Soils that are shallow over bedrock, such as Sogn and Boone Variant soils, dry out rapidly.

Droughtiness can be minimized by reducing the runoff rate, increasing the rate of water intake, and planting drought-tolerant crops. Minimizing tillage and returning crop residue or other organic material to the soil commonly increase the rate of water intake and reduce the runoff rate. Some crops, such as soybeans and grain sorghum, can withstand a limited water supply better than corn. Winter wheat also is better suited than corn because it matures in the spring, before the period of summer droughtiness begins.

In 1979, an estimated 10,000 acres of cropland in Lee County was irrigated. The addition of water to droughty soils during dry periods markedly increases productivity.

Soil fertility ranges from naturally low to high in the soils in Lee County. Many of the soils are naturally acid. Thorp Variant soils are very strongly acid. Tama and Sable soils are slightly acid. Canisteo and Harpster soils are mildly alkaline. On most acid soils, applications of agricultural limestone are needed to maintain or raise the pH level, which should be high enough for the optimum availability of plant nutrients.

Many crops, including corn, remove large amounts of nitrogen from the soils. Erosion, denitrification, and leaching also remove nitrogen from the soil. Some crops, particularly corn and wheat, respond well to applications of nitrogen fertilizer. Adding livestock waste and planting legumes, which fix atmospheric nitrogen in the soil, also help to replenish the nitrogen supply.

In most of the soils in Lee County, the supply of available phosphorus is medium and the supply of available potassium is high. In Harpster and other calcareous soils, however, the phosphorus and potassium are in forms not readily available to plants. Potassium is not readily available in Sparta, Chelsea, and other sandy soils.

Additions of lime, nitrogen, phosphorus, potassium, or other elements should be based on the results of soil tests. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime needed.

Soil tilth affects the germination of seeds, the amount of runoff, and the intake of water into the soil. It is good in soils that are granular and porous.

In most of the soils in the county, good tilth is maintained because of a sufficient content of organic matter in the surface soil. In some soils, such as Fayette and Miami soils, however, the organic matter content is low. In these soils a surface crust forms during periods of intense rainfall. It increases the runoff rate and decreases the rate of water intake. Growing grasses and legumes and regularly adding crop residue, manure, and other organic material improve soil structure and reduce the likelihood of crusting.

Poor tilth is a problem in Milford, Sable, and other dark soils that have a silty clay loam surface layer. These soils commonly stay wet until late in spring. If plowed when wet, they tend to be very cloddy. As a result of the cloddiness, preparing a seedbed is difficult. Tilling these soils in the fall generally results in good tilth in the spring.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. The capability classification is also shown for each map unit. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and

results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (*12*). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in table 6.

Woodland Management and Productivity

Only 7.5 percent of Lee County was originally covered by hardwood forests. At present, about 8,140 acres, or less than 2 percent of the county, is woodland. Most of the woodland is in the Sand Hills area and in areas where the soils are shallow over bedrock. These areas are in associations 5, 12, and 13, which are described in the section "General Soil Map Units." Very little of the woodland is managed for timber.

Measures that improve timber stands and protect the stands from grazing increase the productivity of the woodland. Planting fast-growing conifers in harvested areas can result in maximum productivity. The Illinois Department of Conservation, the Cooperative Extension Service, and the Soil Conservation Service can help plan woodland management.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each suitable soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that few trees may be blown down by strong winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

Recreation

Recreation areas are assets in Lee County because they tend to promote economic growth. These areas are used for campgrounds, nature sites, hunting, riding stables, public and private shooting preserves, and water sports. Public recreation areas include the Green River State Conservation Area, Lowell Park, and Rock River. The county has several privately owned recreation facilities (fig. 11).

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water

Figure 11.—A highway borrow pit reclaimed for water-based recreation.

impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet,

are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

In the past 150 years, intensive agriculture has radically decreased and altered the wildlife habitat in Lee County. Wetlands, including Inlet and Winnebago Swamps, were the natural habitat for a great variety and number of wildlife species (fig. 12). Plowing and draining the wetlands deprived the county of a rich wildlife heritage.

The county still has a variety of wildlife species, including deer, rabbit, fox, squirrel, pheasant, Hungarian partridge, mourning dove, muskrat, raccoon, skunk, opossum, badger, woodchuck, and beaver. Only a few quail and beaver inhabit the county.

The surface waters in Lee County provide good habitat for several species of fish. Bluegill, largemouth bass, green sunfish, channel catfish, and smallmouth bass are common game fish in the rivers, streams, and ponds. Carp and buffalofish are also common in the Rock and Green Rivers and the smaller streams (*9*). The Green River State Conservation Area, which is about 2,330 acres in size, and 3,266 acres of private hunting preserves provide habitat for wildlife.

Wet or ponded areas provide good habitat for wetland wildlife. The food value of natural wetland plants commonly is rated higher than that of agricultural crops for waterfowl and many other wildlife species. In areas where open water does not occur or where wetlands have become filled with sediment or crowded by vegetation, constructing irregularly shaped open water areas about 2 to 4 feet deep and 0.1 to several acres in size enhances the habitat for waterfowl and furbearers if about two-thirds of the wetland remains vegetated. The habitat for several species of shore birds and waterfowl can be improved by establishing grassy nesting cover on the adjacent uplands at a rate of 4 acres of grass per 1 acre of wetland. Livestock should be excluded from the wetlands and the areas of nesting cover. Controlling erosion on adjacent land helps to keep sediment from filling in wetlands and destroying the plant communities.

The quality of woodland wildlife habitat depends on the quality of the woodland plant community. The habitat can support the greatest diversity of woodland wildlife species if it is managed for a wide diversity of tree and shrub species. Maximum production of wildlife can be achieved by establishing a shrub or brushy edge around the woodland. The shrubs should be cut back every 3 to 5 years. In the interior of the woodland, a continuous supply of young trees and shrubs is needed in the understory and a wide variety of tree species is needed in the canopy. Dead trees or snags should be left standing because they provide habitat for cavity-nesting species and provide perching and feeding sites. Fallen logs and brush piles provide valuable cover for prey species. The woodland should be protected from fire and grazing.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants (fig. 13).

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are

Figure 12.—An area of wetland, which provides habitat for a wide variety of waterfowl and invertebrate animals, many of them rare in Illinois.

very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and sunflowers.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are orchardgrass, bluegrass, bromegrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and ragweed.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, pondweed, cattail, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include warblers, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and chipmunks.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Figure 13.—Cover strips on Orio soils in the foreground and Parr and Dickinson soils in the background. These strips increase the wildlife population.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of

gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

A landfill must be able to bear heavy vehicular traffic. It involves a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect area landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or

soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 18.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing and the amount of soil lost. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops.

They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to soil blowing.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

In table 17, some soils are assigned to two hydrologic groups. The first letter is for drained areas, and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than

that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*13*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Typic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (*11*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*13*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Adrian Series

The Adrian series consists of deep, very poorly drained soils in depressions on outwash plains. These soils formed in herbaceous organic deposits 16 to 50 inches deep over sandy outwash. Permeability is moderately slow in the organic layers and moderately rapid in the sandy material. Slope is less than 2 percent.

Adrian soils are similar to Houghton soils and are commonly adjacent to Chelsea, Comfrey, Gilford, and Hoopeston soils. Houghton soils have a mineral substratum below a depth of 51 inches. Chelsea, Comfrey, Gilford, and Hoopeston soils formed entirely in

mineral material. Chelsea soils are on dunal ridges. Comfrey and Gilford soils are in positions on the landscape similar to those of the Adrian soils. Hoopeston soils are on the slightly higher parts of the landscape.

Typical pedon of Adrian muck, 816 feet north and 218 feet west of the southeast corner of sec. 28, T. 20 N., R. 10 E.

Oa1—0 to 12 inches; black (N 2/0) rubbed sapric material; about 15 percent fiber, less than 5 percent rubbed; weak fine granular structure; friable; many fine roots; noticeable sand; neutral; abrupt smooth boundary.

Oa2—12 to 34 inches; black (N 2/0) rubbed sapric material; about 15 percent fiber, less than 5 percent rubbed; weak medium subangular blocky structure; friable; many fine roots; noticeable sand; neutral; clear smooth boundary.

C—34 to 60 inches; grayish brown (10YR 5/2) loamy sand; single grain; few fine roots; neutral.

The thickness of the sapric material ranges from 20 to 50 inches and is the same as the depth to the sandy C horizon. Some pedons have hemic or undecomposed layers. In some pedons woody fragments 1/8 inch to 2 inches in diameter are mixed into the organic horizons.

Ashdale Series

The Ashdale series consists of deep, well drained soils on uplands. These soils formed in 36 to 50 inches of loess and in the underlying material weathered from limestone bedrock. Permeability is moderate in the upper part of the solum and slow in the lower part. Slope ranges from 2 to 10 percent.

Ashdale soils are similar to Catlin, Elburn, Hitt, Plano, and Tama soils and are commonly adjacent to Catlin, Elburn, Plano, and Tama soils. The adjacent soils do not have lithic contact. Hitt soils contain more sand in the upper part of the solum than the Ashdale soils. Catlin, Hitt, Plano, and Tama soils are in positions on the landscape similar to those of the Ashdale soils. Elburn soils are in drainageways and broad low areas.

Typical pedon of Ashdale silt loam, 2 to 5 percent slopes, 18 feet east and 660 feet south of the center of sec. 36, T. 22 N., R. 11 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

AB—9 to 13 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; common moderately thick very dark gray (10YR 3/1) coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—13 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate fine granular; firm; few fine roots; common moderately thick very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—18 to 26 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak fine prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common thin dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—26 to 35 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; few thin dark brown (10YR 4/3) clay films on faces of peds; few thin light brownish gray (10YR 6/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt4—35 to 44 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; few thin dark brown (10YR 4/3) clay films on faces of peds; few thin light brownish gray (10YR 6/2) silt coatings on faces of peds; slightly acid; clear smooth boundary.

Bt5—44 to 48 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; firm; few fine roots; few thin dark brown (10YR 4/3) clay films on faces of peds; few stones, 1 to 5 millimeters in diameter; neutral; clear smooth boundary.

2Bt6—48 to 52 inches; yellowish red (5YR 4/5) and dark yellowish brown (10YR 4/4) silty clay; moderate fine subangular blocky structure; firm; few fine roots; neutral; clear smooth boundary.

2R—52 inches; brownish yellow (10YR 6/6) and reddish brown (5YR 4/4) fractured limestone bedrock.

The thickness of the solum and the depth to bedrock range from 40 to 63 inches. The dark surface layer is 10 to 15 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 to 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 5. It is medium acid to neutral. The 2B horizon has hue of 5YR to 10YR and value and chroma of 3 to 5. It is silty clay or clay.

Ashdale silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is definitive for the Ashdale series. This difference, however, does not significantly affect the use or behavior of the soil.

Assumption Series

The Assumption series consists of deep, moderately well drained soils on till plains. These soils formed in 20 to 40 inches of loess and in a paleosol that formed in

glacial drift. Permeability is moderate in the upper part of the subsoil and moderately slow in the lower part. Slope ranges from 4 to 12 percent.

The Assumption soils in this county have a thinner surface layer than is definitive for the Assumption series. This difference, however, does not significantly affect the use or behavior of the soils.

Assumption soils are similar to Catlin and Prairieville soils and are commonly adjacent to Catlin and Tama soils. Catlin soils do not have a paleosol. They formed in 40 to 50 inches of loess and in the underlying loamy till. Prairieville soils contain more sand in the upper part of the B horizon than the Assumption soils. Also, they have a browner paleosol in the lower part of the B horizon. Tama soils contain less sand in the lower part of the solum than the Assumption soils. They formed entirely in loess. Catlin and Tama soils are upslope from the Assumption soils.

Typical pedon of Assumption silt loam, 4 to 12 percent slopes, eroded, 390 feet west and 462 feet south of the northeast corner of sec. 25, T. 22 N., R. 8 E.

Ap—0 to 7 inches; mixed very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—7 to 14 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; common thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt2—14 to 24 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; few fine roots; continuous thin dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

Bt3—24 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; friable; few fine roots; continuous thin dark brown (10YR 4/3) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); medium acid; clear smooth boundary.

Bt4—27 to 31 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine distinct strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; friable; few fine roots; continuous thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); medium acid; abrupt smooth boundary.

2Btg1—31 to 38 inches; gray (5Y 5/1) clay loam; common fine prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); medium acid; clear smooth boundary.

2Btg2—38 to 49 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent yellowish red (5YR 5/6), common fine distinct yellowish brown (10YR 5/6), and few fine faint gray (5Y 6/1) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

2Btg3—49 to 60 inches; yellowish brown (10YR 5/6) clay loam; common fine distinct grayish brown (2.5Y 5/2) and common fine faint yellowish red (5YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; few fine dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); slightly acid.

The thickness of the solum ranges from about 48 to 70 inches, depending on the amount of geologic truncation prior to loess deposition. The dark surface layer is 6 to 9 inches thick.

The Bt horizon is medium acid or slightly acid. The 2Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 to 6. It is medium acid to neutral.

Ayr Series

The Ayr series consists of deep, well drained, moderately permeable soils on ridgetops and side slopes on dissected till plains. These soils formed in loamy eolian deposits and the underlying loam till. Slope ranges from 1 to 7 percent.

The Ayr soils in this county have a thinner surface layer than is definitive for the Ayr series. Also, they contain less sand in the upper part of the solum. These differences, however, do not significantly affect the use or behavior of the soils.

Ayr soils are similar to Friesland and Parr soils and are commonly adjacent to Chelsea, Odell, Parr, and Sparta soils. Friesland soils contain more silt in the lower part of the solum than the Ayr soils. Chelsea soils do not have a mollic epipedon. Chelsea and Sparta soils are sandy to a depth of 60 inches. They are on the slightly higher dunal ridges. Odell and Parr soils contain more clay and less sand in the upper part of the solum than the Ayr soils. Odell soils are in the lower landscape positions and are somewhat poorly drained. Parr soils are in positions on the landscape similar to those of the Ayr soils.

Typical pedon of Ayr sandy loam, 1 to 7 percent slopes, eroded, 171 feet west and 1,778 feet south of the northeast corner of sec. 24, T. 19 N., R. 9 E.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) sandy loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.
Bw1—8 to 11 inches; dark yellowish brown (10YR 4/4) sandy loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; friable; few fine roots; common thin very dark grayish brown (10YR 3/2) coatings on faces of peds; slightly acid; clear smooth boundary.
Bw2—11 to 16 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; few fine roots; few thin very dark grayish brown (10YR 3/2) coatings on faces of peds; neutral; clear smooth boundary.
Bw3—16 to 27 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; few fine roots; slightly acid; abrupt smooth boundary.
2Bt—27 to 39 inches; dark brown (7.5YR 4/4) loam; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.
2C—39 to 60 inches; dark brown (7.5YR 4/4) loam; few fine faint yellowish brown (10YR 5/6) and few fine distinct yellowish brown (10YR 5/8) mottles; massive; firm; few fine roots; few fine dark concretions (iron and manganese oxides); mildly alkaline; slight effervescence.

The thickness of the solum ranges from 36 to 50 inches. The dark surface layer is 6 to 9 inches thick.

The Ap and Bw horizons are dominantly sandy loam, but the range includes loamy sand and loamy fine sand. The Bw horizon has value of 4 or 5 and chroma of 3 or 4. It is strongly acid to neutral. The 2Bt horizon has hue of 10YR or 7.5YR and value of 4 or 5. It is loam or clay loam. It is medium acid to neutral.

Billett Series

The Billett series consists of deep, well drained soils on uplands and terraces. These soils formed in loamy and sandy sediments reworked by the wind. Permeability is moderately rapid in the upper part of the solum and rapid in the lower part and in the substratum. Slope ranges from 0 to 12 percent.

Billett soils are similar to Dickinson soils and are commonly adjacent to Chelsea and Hoopeston soils. Dickinson soils have a mollic epipedon. Chelsea soils do not have a dark surface layer. They contain more sand in the upper part of the solum than the Billett soils. Also, they are slightly higher on the landscape. The somewhat poorly drained Hoopeston soils are in the lower landscape positions. Their dark surface layer is thicker than that of the Billett soils.

Typical pedon of Billett fine sandy loam, 0 to 3 percent slopes, 1,230 feet east and 630 feet north of the southwest corner of sec. 29, T. 20 N., R. 10 E.

Ap—0 to 7 inches; mixed very dark grayish brown (10YR 3/2) and dark brown (7.5YR 4/4) fine sandy loam, brown (10YR 5/3) dry; weak fine granular structure; very friable; few fine roots; neutral; abrupt smooth boundary.
Bt—7 to 15 inches; dark brown (7.5YR 4/4) fine sandy loam; moderate medium subangular blocky structure; very friable; few fine roots; common thin very dark grayish brown (10YR 3/2) clay films on faces of peds; slightly acid; clear smooth boundary.
Bw1—15 to 23 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; very dark grayish brown (10YR 3/2) channel fillings; slightly acid; clear smooth boundary.
Bw2—23 to 26 inches; strong brown (7.5YR 5/6) loamy sand; weak medium subangular blocky structure; very friable; few fine roots; slightly acid; clear smooth boundary.
BC—26 to 33 inches; strong brown (7.5YR 5/6) fine sand; weak medium subangular blocky structure; very friable; few fine roots; medium acid; clear smooth boundary.
C—33 to 60 inches; yellowish brown (10YR 5/4) fine sand; single grain; loose; two strong brown (7.5YR 5/6) loamy fine sand lamellae, less than 1 centimeter thick, at depths of 46 and 49 inches; slightly acid.

The thickness of the solum ranges from 30 to 60 inches. The dark surface layer is 6 to 9 inches thick. The depth to carbonates is more than 60 inches.

The B horizon has hue of 10YR or 7.5YR. In some pedons it has subhorizons of loamy fine sand. It is slightly acid to strongly acid. The C horizon commonly is fine sand, loamy fine sand, loamy sand, or sand. It commonly has lamellae 1 to 3 centimeters thick. It is medium acid to neutral.

Billett fine sandy loam, 5 to 12 percent slopes, eroded, has free carbonates slightly closer to the surface than is definitive for the Billett series. This difference, however, does not significantly affect the use or behavior of the soil.

Binghampton Series

The Binghampton series consists of deep, somewhat poorly drained soils on till plains. These soils formed in loamy and sandy material and in the underlying glacial

till, which has a paleosol. Permeability is moderate in the loamy sediments, very rapid in the sandy sediments, and moderately slow in the paleosol. Slope ranges from 0 to 3 percent.

Binghampton soils are similar to Nachusa and Vanpetten soils and are commonly adjacent to Dakota, Nachusa, Thorp Variant, and Vanpetten soils. Dakota soils do not have a paleosol within a depth of 60 inches. They are on low, dune-shaped ridges and are well drained. Nachusa and Thorp Variant soils have a mollic epipedon and do not have coarse textured horizons. Nachusa soils are in positions on the landscape similar to those of the Binghampton soils. The poorly drained Thorp Variant soils are in depressions. Vanpetten soils have a mollic epipedon. They are on the slightly higher parts of the landscape and are moderately well drained.

Typical pedon of Binghampton sandy loam, 0 to 3 percent slopes, in a cultivated field; 975 feet east and 205 feet south of the center of sec. 16, T. 20 N., R. 9 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

BA—8 to 12 inches; brown (10YR 4/3) loam; moderate fine and medium subangular blocky structure; friable; common fine roots; many thin dark brown (10YR 3/3) organic coatings on faces of peds; common fine dark accumulations (iron and manganese oxides); medium acid; clear smooth boundary.

Bt1—12 to 17 inches; brown (10YR 4/3) loam; common medium faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; many fine and few medium dark accumulations (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt2—17 to 24 inches; grayish brown (10YR 5/2) loam; common fine faint dark yellowish brown (10YR 4/4) and common fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; friable; few fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt3—24 to 27 inches; light brownish gray (10YR 6/2) sandy loam; many medium prominent strong brown (7.5YR 5/6) mottles; moderate coarse and medium subangular blocky structure; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); medium acid; abrupt smooth boundary.

2Bt4—27 to 36 inches; pale brown (10YR 6/3) sand; few medium prominent strong brown (7.5YR 5/6), common medium prominent yellowish brown (10YR 5/4), and common medium prominent light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; very friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay bridges; common medium dark accumulations (iron and manganese oxides); strongly acid; clear wavy boundary.

2Bt5—36 to 51 inches; dark brown (10YR 4/3) sand; many medium prominent strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; few fine roots; many thin dark gray (10YR 4/1) clay films on vertical faces of peds; few fine dark accumulations (iron and manganese oxides); slightly acid; abrupt smooth boundary.

3Btgb1—51 to 54 inches; very dark grayish brown (10YR 3/2) clay loam; common fine distinct yellowish brown (10YR 5/6) and few fine faint gray (10YR 5/1) mottles; moderate coarse prismatic structure; firm; common thick dark grayish brown (10YR 4/2) clay films on vertical faces of peds; few fine dark accumulations (iron and manganese oxides); few pebbles, 5 to 20 millimeters in diameter; slightly acid; clear smooth boundary.

3Btgb2—54 to 66 inches; light gray (10YR 6/1) clay loam; many fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure; firm; few thin grayish brown (10YR 5/2) clay films on faces of peds; common fine dark accumulations (iron and manganese oxides); few pebbles, 5 to 20 millimeters in diameter; neutral.

The thickness of the solum ranges from 60 to more than 70 inches. The thickness of the loamy eolian deposits ranges from 10 to 30 inches. The thickness of the sandy 2B horizon ranges from 13 to 31 inches. The Ap horizon is 6 to 9 inches thick.

The Ap horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly sandy loam but in some pedons is loam. The Bt horizon is dominantly loam, but the range includes clay loam. This horizon is very strongly acid to medium acid. In some pedons it has hue of 2.5YR in the lower part. The 2Bt horizon has hue of 2.5Y in some pedons. It has value of 4 to 6 and chroma of 1 to 8. It is extremely acid to slightly acid. The 3Bt horizon is dominantly clay loam or silty clay loam, but the range includes loam and silt loam. This horizon is very strongly acid to neutral.

Birkbeck Series

The Birkbeck series consists of deep, moderately well drained, moderately permeable soils on dissected till plains. These soils formed in 40 to 60 inches of loess

and in the underlying loamy glacial till. Slope ranges from 2 to 10 percent.

Birkbeck soils are similar to Fayette and Miami soils and are commonly adjacent to Fayette, Miami, and Whalan soils. The well drained Fayette soils formed entirely in loess. They are in positions on the landscape similar to those of the Birkbeck soils. The well drained Miami soils formed in less than 18 inches of loess and in the underlying till. Whalan soils formed in loamy material and in the underlying clayey material weathered from limestone. They are 20 to 40 inches deep over bedrock.

Typical pedon of Birkbeck silt loam, 2 to 5 percent slopes, 1,600 feet north and 800 feet east of the center of sec. 24, T. 19 N., R. 11 E.

Ap—0 to 9 inches; mixed dark grayish brown (10YR 4/2) and dark brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

Bt1—9 to 14 inches; dark brown (10YR 4/3) silty clay loam; weak fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—14 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—22 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

Bt4—30 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; many fine faint brown (10YR 5/3) and many fine faint yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

2BC—40 to 44 inches; dark brown (7.5YR 4/4) clay loam; common fine faint grayish brown (10YR 5/2) and many fine faint strong brown (7.5YR 5/8) mottles; weak medium prismatic structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

2C—44 to 60 inches; dark brown (7.5YR 4/4) loam; few fine faint strong brown (7.5YR 5/8) mottles; massive; firm; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 44 to 60 inches. The Ap horizon has value of 4 or 5 and chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. In some pedons it is medium acid or strongly acid in the lower part. The 2BC horizon has hue of 7.5YR or 10YR. It is medium acid to neutral. The 2C horizon is typically calcareous loam, but the range includes calcareous clay loam and silty clay loam.

Boone Variant

The Boone Variant consists of shallow, excessively drained, rapidly permeable soils on uplands. These soils formed in sandy material weathered from sandstone bedrock. Slope ranges from 7 to 35 percent.

Boone Variant soils are similar to Eleva soils and are commonly adjacent to Eleva, Martinsville, and Whalan soils. Eleva soils contain less sand and more clay in the solum than the Boone Variant soils. They are more than 20 inches deep over sandstone. They are in positions on the landscape similar to those of the Boone Variant soils. Martinsville soils are upslope from the Boone Variant soils. They are fine-loamy and are more than 60 inches deep over bedrock. Whalan soils are fine-loamy and are 20 to 40 inches deep over limestone. They are on side slopes below the Boone Variant soils.

Typical pedon of Boone Variant, loamy fine sand, 7 to 15 percent slopes, about one-half mile south of the Ogle-Lee County line, along Lowden Road; 2,456 feet north and 360 feet west of the southeast corner of sec. 21, T. 22 N., R. 10 E.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) loamy fine sand, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to weak medium granular; very friable; common fine roots; few pebbles, 20 millimeters in diameter; medium acid; abrupt smooth boundary.

Bw1—6 to 10 inches; yellowish brown (10YR 5/6) loamy fine sand; weak fine subangular blocky structure; very friable; few fine roots; few sandstone fragments, 2 to 20 millimeters in diameter; few pebbles, 20 millimeters in diameter; very strongly acid; clear smooth boundary.

Bw2—10 to 18 inches; yellowish brown (10YR 5/6) fine sand; weak medium prismatic structure parting to weak fine subangular blocky; very friable; few fine roots; very strongly acid; clear smooth boundary.

Cr—18 inches; mottled yellowish brown (10YR 5/6) and light gray (10YR 7/2) fractured sandstone; weakly cemented; few fine roots; very strongly acid.

Sandstone bedrock is within a depth of 20 inches. The content of coarse fragments less than 3 inches in size ranges, by volume, from 0 to 15 percent in the solum.

The A horizon has value of 3 to 5 and chroma of 1 to 3. It is loamy fine sand or fine sand. The Bw horizon has value of 4 to 6 and chroma of 1 to 6. It is loamy fine sand or fine sand. It has weak subangular blocky or weak prismatic structure. It is strongly acid or very strong acid.

Canisteo Series

The Canisteo series consists of deep, poorly drained soils on outwash plains and lake plains. These soils formed in loamy and silty sediments underlain by sandy material. Permeability is moderate in the solum and rapid in the substratum. Slope ranges from 0 to 2 percent.

Canisteo soils are similar to Harpster soils and are commonly adjacent to Gilford, Harpster, Hartsburg, Hoopeston, and Selma soils. Harpster soils contain less sand in the solum than the Canisteo soils. They have a calcic horizon. They are in positions on the landscape similar to those of the Canisteo soils. Gilford, Hartsburg, Hoopeston, and Selma soils do not have carbonates in the upper part of the solum. The content of clay in the 10- to 40-inch control section of Gilford and Hoopeston soils averages less than 18 percent. Gilford, Hartsburg, and Selma soils are in positions on the landscape similar to those of the Canisteo soils. The somewhat poorly drained Hoopeston soils are in the slightly higher landscape positions.

Typical pedon of Canisteo silt loam, sandy substratum, 210 feet north and 444 feet east of the southwest corner of sec. 33, T. 39 N., R. 1 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; about 2 percent gravel; mildly alkaline; strong effervescence; abrupt smooth boundary.

AB—8 to 13 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; about 2 percent gravel; mildly alkaline; violent effervescence; abrupt smooth boundary.

Bg1—13 to 19 inches; dark gray (10YR 4/1) silt loam, gray (10YR 5/1) dry; moderate medium subangular blocky structure; friable; about 2 percent gravel; mildly alkaline; violent effervescence; abrupt smooth boundary.

Bg2—19 to 25 inches; gray (5Y 5/1) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; about 2 percent gravel; common moderately thick dark gray (10YR 4/1) clay films on faces of peds; mildly alkaline; slight effervesence; abrupt smooth boundary.

Bg3—25 to 33 inches; gray (5Y 5/1) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; about 2 percent gravel; common moderately thick dark gray (10YR 4/1) clay films on faces on peds; mildly alkaline; slight effervescence; clear smooth boundary.

Bg4—33 to 39 inches; gray (5Y 6/1) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate coarse subangular blocky; friable; about 2 percent gravel; common moderately thick dark gray (10YR 4/1) clay films on faces of peds; mildly alkaline; slight effervescence; clear smooth boundary.

Bg5—39 to 49 inches; gray (5Y 6/1) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse subangular blocky structure; friable; about 2 percent gravel; mildly alkaline; violent effervescence; clear smooth boundary.

Bg6—49 to 54 inches; mottled very dark gray (10YR 3/1) and dark gray (10YR 4/1) loam; weak medium subangular blocky structure; friable; mildly alkaline; strong effervescence; abrupt smooth boundary.

2Cg—54 to 60 inches; olive gray (5Y 5/2) sand; single grain; loose; mildly alkaline; violent effervescence.

The thickness of the solum ranges from 45 to 54 inches. The mollic epipedon is 12 to 19 inches thick.

The A horizon has chroma of 1 or 2. It is dominantly silt loam, but the range includes loam and clay loam. The Bg horizon has chroma of 1 or 2. It commonly is silt loam, but the range includes clay loam, loam, and sandy loam and subhorizons of loamy sand less than 5 inches thick. In some pedons this horizon does not have carbonates in the lower part.

Catlin Series

The Catlin series consists of deep, moderately well drained, moderately permeable soils on loess-covered till plains. These soils formed in 40 to 50 inches of loess and in underlying loamy glacial till. Slope ranges from 1 to 10 percent.

Catlin soils are similar to Tama soils and are commonly adjacent to Drummer, Elburn, and Flanagan soils. The poorly drained Drummer soils are in drainageways and shallow depressions. They are underlain by stratified loamy material. The somewhat poorly drained Elburn and Flanagan soils are on the lower slopes and in drainageways. Tama soils formed entirely in loess. They are in positions on the landscape similar to those of the Catlin soils.

Typical pedon of Catlin silt loam, 1 to 5 percent slopes, 1,440 feet south and 87 feet west of the center of sec. 20, T. 21 N., R. 11 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; friable; neutral; abrupt smooth boundary.

AB—7 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure parting to moderate medium granular; friable; slightly acid; clear smooth boundary.

Bt1—11 to 21 inches; dark brown (10YR 4/3) silty clay loam; moderate fine and medium subangular blocky structure; friable; continuous thin dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—21 to 31 inches; brown (10YR 5/3) silty clay loam; many fine distinct yellowish brown (10YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium angular blocky structure; friable; continuous thin dark brown (10YR 3/3) clay films on faces of peds; few fine black (10YR 2/1) concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt3—31 to 38 inches; brown (10YR 5/3) silt loam; many fine distinct yellowish brown (10YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate angular blocky; friable; common thin dark brown (10YR 3/3) clay films on faces of peds; many moderately thick light gray (10YR 7/2) silt coatings on vertical faces of peds; few fine black (10YR 2/1) concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt4—38 to 45 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct yellowish brown (10YR 5/6) and few fine distinct light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure; friable; many moderately thick or thick very dark grayish brown (10YR 3/2) clay films on faces of peds; few small pebbles; less than 10 percent sand mixed in the lower part; neutral; clear smooth boundary.

2BC—45 to 56 inches; yellowish brown (10YR 5/4) loam; few fine distinct brownish yellow (10YR 6/6) mottles; weak coarse prismatic structure; friable; common thin dark brown (10YR 4/3) clay films on vertical faces of peds; common small pebbles; few pebbles 2 centimeters in diameter; mildly alkaline; weak effervescence; clear smooth boundary.

2C—56 to 60 inches; yellowish brown (10YR 5/4) loam; common medium distinct brownish yellow (10YR 6/6) mottles; massive; friable; many small pebbles; mildly alkaline; strong effervescence.

The thickness of the solum ranges from 45 to 59 inches. The mollic epipedon is 10 to 13 inches thick.

The A horizon has chroma of 1 to 3. Some pedons do not have an AB horizon. Some have a BA horizon. The Bt horizon has hue of 10YR or 2.5Y. The 2BC horizon has hue of 10YR, 2.5Y, or 7.5YR, value of 4 or 5, and chroma of 2 to 6. It is clay loam, loam, or silt loam. It is slightly acid to moderately alkaline. The 2C horizon typically is loam, but the range includes clay loam and silt loam.

Catlin silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is definitive for the Catlin series. This difference, however, does not significantly affect the use or behavior of the soil.

Chelsea Series

The Chelsea series consists of deep, excessively drained, rapidly permeable soils on outwash plains and dunes. These soils formed in eolian sand. Slope ranges from 1 to 35 percent.

Chelsea soils are similar to Sparta soils and are commonly adjacent to Ayr, Hoopeston, Miami, Morocco, Orio, and Sparta soils. Sparta soils are in positions on the landscape similar to those of the Chelsea soils. They do not have lamallae within a depth of 60 inches. Their dark surface layer is thicker than that of the Chelsea soils. The well drained Ayr soils have a dark surface layer that is thicker than that of the Chelsea soils. They are downslope from the Chelsea soils and formed in loamy eolian material and in the underlying glacial till. The somewhat poorly drained Hoopeston soils are in the lower landscape positions. They have a mollic epipedon. The well drained, loamy Miami soils are downslope from the Chelsea soils. The somewhat poorly drained Morocco soils are in the lower landscape positions. Orio soils have a dark surface layer that is thicker than that of the Chelsea soils. They are poorly drained and are in depressions.

Typical pedon of Chelsea fine sand, 7 to 20 percent slopes, 1,294 feet north and 876 feet east of the southwest corner of sec. 9, T. 19 N., R. 10 E.

A—0 to 3 inches; very dark gray (10YR 3/1) fine sand, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; few fine roots; slightly acid; abrupt smooth boundary.

E1—3 to 6 inches; dark brown (10YR 4/3) fine sand, yellowish brown (10YR 5/4) dry; weak medium platy structure; loose; few fine roots; strongly acid; clear smooth boundary.

E2—6 to 26 inches; dark yellowish brown (10YR 4/4) fine sand, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; loose; few fine roots; strongly acid; gradual smooth boundary.

E3—26 to 40 inches; brownish yellow (10YR 6/6) fine sand, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; loose; strongly acid; gradual smooth boundary.

E&Bt—40 to 60 inches; brownish yellow (10YR 6/6) sand (E) and dark brown (7.5YR 4/4) loamy sand

bands 1/2 to 1 inch thick (Bt); single grain; loose; medium acid.

The A or Ap horizon is 3 to 9 inches thick. It has value of 3 or 4 and chroma of 1 to 3. It is typically fine sand but in some pedons is loamy sand. The E and E&Bt horizons commonly are medium acid in one or more of the subhorizons. The combined thickness of the sandy loam or loamy sand bands ranges from 1 to 6 inches.

Clyde Series

The Clyde series consists of deep, poorly drained, moderately permeable soils in drainageways on till plains. These soils formed in erosional sediments and in the underlying loamy glacial till. Slope is less than 2 percent.

Clyde soils are similar to Selma soils and are commonly adjacent to Binghampton, Nachusa, Odell, and Selma soils. Selma soils formed in loamy material and the underlying stratified, coarse textured outwash. They have a coarse textured C horizon. They are downslope from the Clyde soils. The somewhat poorly drained Binghampton soils are in the slightly higher landscape positions. They have coarse textured horizons above the underlying loamy material. Their dark surface layer is thinner than that of the Clyde soils. Nachusa and Odell soils are somewhat poorly drained and are upslope from the Clyde soils.

Typical pedon of Clyde clay loam, about 1,098 feet south and 192 feet west of the northeast corner of sec. 36, T. 21 N., R. 8 E.

Ap—0 to 6 inches; black (N 2/0) clay loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—6 to 12 inches; black (N 2/0) clay loam, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

AB—12 to 17 inches; very dark gray (10YR 3/1) clay loam, dark gray (10YR 4/1) dry; few fine distinct grayish brown (2.5Y 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

Bg1—17 to 20 inches; grayish brown (2.5Y 5/2) clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; many thin dark grayish brown (10YR 4/2) coatings on faces of peds; few pebbles, 5 to 10 millimeters in diameter; neutral; clear smooth boundary.

Bg2—20 to 24 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; common thin dark grayish brown (10YR 4/2) coatings on faces of peds; few pebbles, 5 to 10 millimeters in diameter; neutral; clear smooth boundary.

Bg3—24 to 32 inches; grayish brown (2.5Y 5/2) clay loam; many fine distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common thin dark grayish brown (10YR 4/2) coatings on faces of peds; few pebbles, 5 to 10 millimeters in diameter; neutral; abrupt smooth boundary.

Bg4—32 to 36 inches; mottled grayish brown (10YR 5/2) and yellowish brown (10YR 5/4 and 10YR 5/8) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few pebbles, 5 to 10 millimeters in diameter; dark krotovinas; neutral; abrupt smooth boundary.

2BC—36 to 45 inches; yellowish brown (10YR 5/8) loam; many fine prominent light gray (10YR 6/1) mottles; weak medium subangular blocky structure; firm; few fine roots; few pebbles, 5 to 10 millimeters in diameter; mildly alkaline; slight effervescence; clear smooth boundary.

2C—45 to 60 inches; yellowish brown (10YR 5/8) loam; many fine prominent light gray (10YR 6/1) mottles; massive; firm; moderately alkaline; strong effervescence.

The thickness of the solum ranges from 30 to 60 inches. The depth to carbonates ranges from 35 to 45 inches. The mollic epipedon is 10 to 23 inches thick.

The Ap and A horizons typically are clay loam, but the range includes silty clay loam, silt loam, and loam. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It has higher chroma mottles. It typically is clay loam, but subhorizons of silty clay loam, loam, and sandy loam are common.

Comfrey Series

The Comfrey series consists of deep, poorly drained, moderately permeable soils on flood plains (fig. 14). These soils formed in loamy alluvium. Slope is less than 2 percent.

Comfrey soils are similar to Lawson and Otter soils and are commonly adjacent to Gilford, Lawson, and Selma soils. Gilford soils are coarse-loamy and do not have a cumulic epipedon. They are on the slightly higher parts of the landscape. Lawson soils are fine-silty. They are somewhat poorly drained and are on the slightly higher parts of the landscape. Otter soils are fine-silty. They are in positions on the landscape similar to those of the Comfrey soils. Selma soils do not have a cumulic epipedon. They are on the slightly higher parts of the landscape.

Typical pedon of Comfrey loam, 970 feet north and 1,625 feet west of the southeast corner of sec. 25, T. 20 N., R. 9 E.

Figure 14.—Flooding in an area of Comfrey soils.

Ap—0 to 8 inches; black (N 2/0) loam, dark gray (10YR 4/1) dry; moderate medium granular structure; friable; few fine roots; neutral; clear smooth boundary.

A1—8 to 16 inches; black (N 2/0) loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; neutral; clear smooth boundary.

A2—16 to 24 inches; black (N 2/0) loam, dark gray (10YR 4/1) dry; few fine distinct strong brown (7.5YR 5/6) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; neutral; clear smooth boundary.

A3—24 to 30 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; many fine distinct strong brown (7.5YR 5/6) mottles; moderate fine prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; neutral; clear smooth boundary.

AC—30 to 34 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; few fine distinct strong brown (7.5YR 5/6) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; neutral; clear smooth boundary.

C1—34 to 50 inches; dark gray (5Y 4/1) loam; few fine faint gray (10YR 5/1) and many fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few thin very dark gray (10YR 3/1) coatings on faces of peds; neutral; clear smooth boundary.

C2—50 to 60 inches; grayish brown (2.5Y 5/2) loamy sand; few fine faint yellowish brown (10YR 5/6) mottles; massive; very friable; neutral.

The thickness of the solum and the thickness of the mollic epipedon range from 28 to 36 inches. Some pedons have free carbonates within a depth of 60 inches.

The A horizon has value of 2 or 3 and chroma of 0 or 1. It is typically loam or silt loam, but the range includes clay loam and silty clay loam. The C horizon is typically loam or clay loam and has coarser textured subhorizons.

Dakota Series

The Dakota series consists of deep, well drained soils on low, dunelike ridges on outwash plains. These soils formed in loamy eolian material and in the underlying glacial outwash. Permeability is moderate in the upper part of the profile and rapid in the lower part. Slope ranges from 1 to 7 percent.

The Dakota soils in this county have a thinner dark surface layer than is definitive for the Dakota series. This difference, however, does not significantly affect the use or behavior of the soils.

Dakota soils are similar to Waukee soils and are commonly adjacent to Binghampton, Sparta, Thorp Variant, and Vanpetten soils. Waukee soils do not have an argillic horizon. They are in the less sloping areas. The somewhat poorly drained Binghampton soils are in the slightly lower landscape positions. They have a loamy buried subsoil. The excessively drained Sparta soils are sandy in the upper part of the solum and do not have an argillic horizon. They are in positions on the landscape similar to those of the Dakota soils. The poorly drained Thorp Variant soils are in depressions. They do not have coarse textures and have an albic horizon. The moderately well drained Vanpetten soils are downslope from the Dakota soils. They do not have an argillic horizon and have a loamy buried subsoil.

Typical pedon of Dakota sandy loam, 1 to 7 percent slopes, eroded, 588 feet east and 1,955 feet north of the southwest corner of sec. 16, T. 20 N., R. 10 E.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) sandy loam; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 16 inches; dark yellowish brown (10YR 4/4) loam; moderate fine subangular blocky structure; friable; common fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—16 to 20 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; common fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—20 to 25 inches; dark yellowish brown (10YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; few fine roots; common thin dark brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

2BC—25 to 35 inches; yellowish brown (10YR 5/4) loamy sand; weak medium subangular blocky structure; very friable; few fine roots; common thin clay bridges between sand grains; strongly acid; clear smooth boundary.

2C—35 to 60 inches; yellowish brown (10YR 5/4) sand; single grain; loose; few fine roots; medium acid.

The thickness of the solum ranges from 24 to 42 inches. The dark surface layer is 6 to 9 inches thick.

The Ap horizon has value of 2 to 4 and chroma of 1 to 4. It is typically sandy loam, but the range includes loam. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is loam or silt loam in the upper part and sandy loam or sandy clay loam in the lower part. It is strongly acid to slightly acid. The 2C horizon is sand or loamy sand. It is strongly acid to slightly acid.

Denny Series

The Denny series consists of deep, poorly drained, slowly permeable soils in upland depressions. These soils formed in deep loess. Slope ranges from 0 to 2 percent.

Denny soils are similar to Orio and Thorp Variant soils and are commonly adjacent to Muscatine, Sable, and Tama soils. Orio and Thorp Variant soils are fine-loamy. Thorp Variant soils have a mollic epipedon and have clay loam in the lower part of the solum. The somewhat poorly drained Muscatine and moderately well drained Tama soils are on the higher parts of the landscape. They have a mollic epipedon. Sable soils also have a mollic epipedon. They are on wide interstream divides.

Typical pedon of Denny silt loam, about 3.5 miles northeast of Amboy; 1,695 feet west and 162 feet north of the southeast corner of sec. 32, T. 21 N., R. 11 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

E—9 to 14 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine platy structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Btg1—14 to 25 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to strong fine subangular blocky; firm; few fine roots; common moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg2—25 to 31 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent strong brown (7.5YR 5/6) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to strong fine subangular blocky; firm; few fine roots; continuous moderately thick very dark grayish brown (10YR 3/2) coatings

on faces of peds; slightly acid; clear smooth boundary.

Btg3—31 to 39 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent strong brown (7.5YR 5/6) and common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to strong medium subangular blocky; firm; few fine roots; common moderately thick dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Btg4—39 to 53 inches; light brownish gray (10YR 6/2) silt loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

BCg—53 to 60 inches; light brownish gray (10YR 6/2) silt loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure; friable; few fine roots; dark gray (10YR 4/1) root channel fillings; slightly acid.

The thickness of the solum ranges from 50 to more than 60 inches. The dark surface layer is 6 to 9 inches thick.

The upper part of the Bt horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 or 2. The lower part of the Bt horizon has value of 5 or 6 and chroma of 1 or 2. Some pedons have a C horizon, which is silt loam and is neutral or mildly alkaline.

Dickinson Series

The Dickinson series consists of deep, somewhat excessively drained soils on dunes on uplands and outwash plains. These soils formed in loamy eolian material. Permeability is moderately rapid in the upper part of the solum and rapid in the lower part. Slope ranges from 0 to 10 percent.

Dickinson soils are similar to Billett soils and are commonly adjacent to Dakota, Hoopeston, Sparta, and Waukee soils. Billett soils do not have a mollic epipedon and have an argillic horizon. The well drained Dakota and Waukee soils contain more clay in the upper part of the solum than the Dickinson soils. Dakota soils are in positions on the landscape similar to those of the Dickinson soils. Waukee soils are on the lower parts of the landscape. The somewhat poorly drained Hoopeston soils also are on the lower parts of the landscape. The excessively drained Sparta soils are on the higher parts. They contain more sand in the upper part of the solum than the Dickinson soils.

Typical pedon of Dickinson sandy loam, 0 to 3 percent slopes, 1,110 feet east and 900 feet north of the southwest corner of sec. 25, T. 20 N., R. 9 E.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

A—8 to 17 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

BA—17 to 29 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; few fine roots; many thin dark brown (10YR 3/3) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt—29 to 37 inches; dark yellowish brown (10YR 4/4) loamy sand; weak medium subangular blocky structure; very friable; few fine roots; common thin brown (10YR 4/3) clay bridges between sand grains; medium acid; clear smooth boundary.

BC—37 to 48 inches; brown (7.5YR 4/4) loamy sand; weak medium subangular blocky structure; very friable; slightly acid; clear smooth boundary.

C—48 to 60 inches; yellowish brown (10YR 5/4) sand; common fine faint yellowish brown (10YR 5/6) mottles; single grain; loose; slightly acid.

The thickness of the solum ranges from 30 to 50 inches. The mollic epipedon is 10 to 17 inches thick.

The B horizon has value of 4 or 5 and chroma of 3 to 6. In some pedons it has subhorizons with hue of 7.5YR. Mottles with chroma of 3 or higher commonly are in the lower part of the BC horizon. Some pedons have a strongly acid subhorizon. The C horizon is commonly loamy sand or sand. Some pedons have a loamy substratum. A few thin high chroma iron bands are below a depth of 40 inches in some pedons.

Dickinson sandy loam, loamy substratum, 1 to 5 percent slopes, eroded, and Dickinson sandy loam, loamy substratum, 5 to 10 percent slopes, eroded, have a thinner dark surface layer than is definitive for the Dickinson series. This difference, however, does not affect the use or behavior of the soils.

Downs Series

The Downs series consists of deep, moderately well drained, moderately permeable soils on uplands. These soils formed in deep loess. Slope ranges from 2 to 5 percent.

Downs soils are similar to Fayette and Tama soils and are commonly adjacent to Fayette, Muscatine, and Tama soils. Fayette soils have an ochric epipedon. They are in positions on the landscape similar to those of the Downs soils. Muscatine soils have a mollic epipedon. They are somewhat poorly drained and are in the slightly lower landscape positions. Tama soils have a mollic epipedon. They are in positions on the landscape similar to those of the Downs soils.

Typical pedon of Downs silt loam, 2 to 5 percent slopes, about 1 mile northwest of Dixon; 30 feet north and 1,408 feet west of the southeast corner of sec. 25, T. 22 N., R. 8 E.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and dark brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

BA—8 to 12 inches; dark brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure parting to moderate medium granular; friable; few fine roots; many thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—12 to 18 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; many thin dark brown (10YR 3/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—18 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; many thin brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—24 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few thin brown (10YR 4/3) clay films on faces of peds; few fine dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

Bt4—30 to 35 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; few thin brown (10YR 4/3) clay films on faces of peds; few fine dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

Bt5—35 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; few thin brown (10YR 4/3) clay films on faces of peds; few fine dark stains (iron and manganese oxides); medium acid; clear smooth boundary.

Bt6—48 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) and few fine faint pale brown (10YR 6/3) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few thin brown (10YR 4/3) clay films on faces of peds; few fine dark stains (iron and manganese oxides); medium acid.

The thickness of the solum ranges from 50 to more than 60 inches. The dark surface layer is 6 to 9 inches thick.

The B horizon has value of 4 or 5 and chroma of 3 to 6. The upper part of this horizon is neutral to strongly acid. The lower part is silty clay loam or silt loam.

Drummer Series

The Drummer series consists of deep, poorly drained, moderately permeable soils in drainageways and slight depressions on glacial till plains and outwash plains. These soils formed in loess and in the underlying stratified outwash. Slope ranges from 0 to 2 percent.

Drummer soils are similar to Selma soils and are commonly adjacent to Catlin, Elburn, Harpster, and Saybrook soils. The moderately well drained Catlin and Saybrook soils are in the higher landscape positions. The somewhat poorly drained Elburn soils are on the slightly higher parts of the landscape. Harpster soils have a calcic horizon. They are in positions on the landscape similar to those of the Drummer soils. Selma soils contain more sand in the upper part of the solum than the Drummer soils. They are in the lower landscape positions and are subject to flooding.

Typical pedon of Drummer silty clay loam, 2,280 feet west and 120 feet south of the northeast corner of sec. 19, T. 39 N., R. 1 E.

Ap—0 to 10 inches; black (N 2/0) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—10 to 16 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

Bg1—16 to 22 inches; gray (5Y 5/1) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg2—22 to 28 inches; olive gray (5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bg3—28 to 46 inches; olive gray (5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/8) and few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few moderately thick black (10YR 2/1) linings in channels; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

2Bg4—46 to 52 inches; olive gray (5Y 5/2) loam; few fine prominent yellowish brown (10YR 5/8) and few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; few moderately thick black (10YR 2/1) linings in channels; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

2Bg5—52 to 60 inches; olive gray (5Y 5/2) sandy clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; neutral.

The thickness of the solum ranges from 45 to 62 inches. The mollic epipedon is 12 to 18 inches thick.

The A horizon is neutral in hue or has hue of 10YR or 2.5Y. It has chroma of 0 to 2. The Bg horizon has hue of 5Y or 2.5Y, value of 4 to 6, and chroma of 1 to 3. The 2B horizon is silt loam, loam, clay loam, or sandy clay loam. It is neutral or mildly alkaline. Some pedons have a 2C horizon, which is stratified loam to loamy sand. The gravelly substratum phase has the gravelly analogs of these textures.

Du Page Series

The Du Page series consists of deep, moderately well drained, moderately permeable soils on flood plains. These soils formed in alluvial sediments. Slope ranges from 0 to 2 percent.

Du Page soils are similar to Millington soils and are commonly adjacent to Lawson, Millington, and Ross soils. The noncalcareous, somewhat poorly drained Lawson soils are in the slightly lower landscape positions. The poorly drained Millington soils are in the lower landscape positions. The noncalcareous, well drained Ross soils are in the slightly higher landscape positions and are subject to rare flooding.

Typical pedon of Du Page silt loam, 1,107 feet east and 160 feet north of the southwest corner of sec. 10, T. 21 N., R. 8 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; few fine roots; slight effervescence; mildly alkaline; abrupt smooth boundary.

A1—8 to 16 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few fine roots; strong effervescence; mildly alkaline; clear smooth boundary.

A2—16 to 22 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few fine roots; thin continuous very dark gray (10YR 3/1) coatings on faces of peds; many shell fragments; strong effervescence; mildly alkaline; clear smooth boundary.

A3—22 to 39 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to weak fine granular; friable; few fine roots; many thin very dark gray (10YR 3/1) coatings on faces of peds; many shell fragments; strong effervescence; mildly alkaline; gradual smooth boundary.

Bw—39 to 52 inches; dark grayish brown (10YR 4/2) loam; weak fine subangular blocky structure; friable; few fine roots; few thin very dark gray (10YR 3/1) coatings on faces of peds; many shell fragments; strong effervescence; mildly alkaline; clear smooth boundary.

C—52 to 60 inches; dark grayish brown (10YR 4/2) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; many shell fragments; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 43 to 52 inches. The thickness of the epipedon ranges from 30 to 50 inches.

The A horizon is silt loam or loam. The B horizon has value of 3 or 4 and chroma of 2 or 3. In some pedons it does not occur. The C horizon is commonly sandy loam, but the range includes stratified loam, sandy loam, and clay loam. This horizon is mottled in some pedons.

Elburn Series

The Elburn series consists of deep, somewhat poorly drained, moderately permeable soils on glacial till plains and glacial outwash plains. These soils formed in loess and in the underlying stratified loamy material. Slope ranges from 0 to 2 percent.

Elburn soils are similar to Muscatine soils and are commonly adjacent to Catlin, Drummer, and Plano soils. Muscatine soils formed entirely in loess. The moderately well drained Catlin and Plano soils are in the higher landscape positions. Catlin soils have loam till in the lower part of the solum. The poorly drained Drummer soils are in the lower landscape positions.

Typical pedon of Elburn silt loam, 1,600 feet west and 345 feet south of the northeast corner of sec. 19, T. 39 N., R. 1 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—10 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; common thin very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—15 to 20 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine distinct strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure parting to moderate medium granular; friable; common thin very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—20 to 28 inches; grayish brown (10YR 5/2) silty clay loam; few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; friable; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; moderately thick very dark gray (10YR 3/1) linings in channels; medium acid; clear smooth boundary.

Bt3—28 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt4—40 to 51 inches; grayish brown (10YR 5/2) silty clay loam; many medium prominent yellowish red (5YR 5/8) and few medium prominent reddish brown (5YR 4/4) mottles; moderate medium prismatic structure; friable; few fine dark concretions (iron and manganese oxides); slightly acid; gradual smooth boundary.

2Bt5—51 to 55 inches; grayish brown (10YR 5/2) loam; many medium prominent yellowish red (5YR 5/6) and strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; friable; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); less than 5 percent gravel; neutral; clear smooth boundary.

2C—55 to 68 inches; grayish brown (10YR 5/2) stratified sandy loam, sandy clay loam, and clay loam; many medium prominent strong brown (7.5YR 5/6) and many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; common thin very dark gray (10YR 3/1) organic coatings on faces of vertical cleavage planes and in old root channels; few fine dark concretions (iron and manganese oxides); less than 5 percent gravel; neutral.

The thickness of the solum ranges from 40 to 65 inches. The mollic epipedon is 10 to 18 inches thick.

Some pedons have a BA horizon. The Bt horizon has chroma of 2 or 3 and commonly has mottles with chroma of 2 to 8. It is medium acid to neutral. The 2B horizon has hue of 10YR, 7.5YR, 2.5Y, or 5Y. It is sandy loam, loam, or silt loam. It is neutral or mildly alkaline. The 2C horizon is stratified loam, clay loam, sandy clay loam, sandy loam, loamy sand, or sand. The gravelly substratum phase has the gravelly analogs of these textures.

Eleva Series

The Eleva series consists of moderately deep, somewhat excessively drained, moderately rapidly permeable soils on upland side slopes adjacent to the major drainageways. These soils formed in 20 to 40 inches of material weathered from sandstone bedrock (fig. 15). Slope ranges from 7 to 35 percent.

Eleva soils are similar to Billett and Boone Variant soils and are commonly adjacent to Billett, Boone Variant, Martinsville, and Whalan soils. Billett soils have a mollic epipedon and do not have sandstone bedrock within a depth of 60 inches. They are in the less sloping areas. Boone Variant soils contain more sand in the upper part of the solum than the Eleva soils. They have sandstone bedrock at a depth of less than 20 inches. They are in positions on the landscape similar to those of the Eleva soils. Martinsville soils are fine-loamy and are more than 60 inches deep over bedrock. They are upslope from the Eleva soils. Whalan soils are fine-loamy and are underlain by limestone. They are upslope from the Eleva soils.

Typical pedon of Eleva fine sandy loam, 7 to 15 percent slopes, 690 feet east and 1,640 feet north of the center of sec. 23, T. 22 N., R. 9 E.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; few fine roots; neutral; abrupt smooth boundary.

BA—4 to 8 inches; dark yellowish brown (10YR 4/4) fine sandy loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure parting to weak fine granular; very friable; few fine roots; common thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Bt1—8 to 12 inches; yellowish brown (10YR 5/4) fine sandy loam; weak fine subangular blocky structure; very friable; few fine roots; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—12 to 18 inches; brown (7.5YR 5/4) sandy loam; moderate medium subangular blocky structure; very friable; few fine roots; common thin dark brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—18 to 32 inches; brown (7.5YR 5/4) fine sandy loam; moderate medium subangular blocky structure; very friable; few fine roots; many thin dark brown (7.5YR 4/4) clay films on faces of peds; medium acid; abrupt smooth boundary.

Figure 15.—An area of Eleva soils where sandstone crops out.

Cr—32 to 37 inches; yellowish brown (10YR 5/4) sandstone; weakly cemented; medium acid; abrupt smooth boundary.

R—37 inches; very pale brown (10YR 7/4) sandstone; strongly cemented; medium acid.

The thickness of the solum ranges from 20 to 40 inches. The A horizon has hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 to 4. It is dominantly fine sandy loam, but the range includes sandy loam. The B horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is strongly acid to neutral.

Fayette Series

The Fayette series consists of deep, well drained, moderately permeable soils on uplands. These soils formed in loess. Slope ranges from 2 to 15 percent.

Fayette soils are similar to Birkbeck soils and commonly are adjacent to Birkbeck and Downs soils. The adjacent soils are moderately well drained. Birkbeck soils are in positions on the landscape similar to those of the Fayette soils. They have loamy glacial till at a depth of 40 to 60 inches. Downs soils are in the less sloping areas. They have a dark Ap horizon.

Typical pedon of Fayette silt loam, 5 to 10 percent slopes, eroded, 1,180 feet north and 565 feet east of the center of sec. 36, T. 22 N., R. 8 E.

Ap—0 to 6 inches; mixed dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

BE—6 to 12 inches; dark yellowish brown (10YR 4/4) silt loam; moderate fine subangular blocky structure; friable; few fine roots; many thin dark brown (10YR 3/3) organic coatings on faces of peds; few thin light gray (10YR 7/2) silt coatings on faces of peds when dry; neutral; clear smooth boundary.

Bt1—12 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; continuous thin dark brown (10YR 3/3) clay films on faces of peds; common thin light gray (10YR 7/2) silt coatings on

faces of peds when dry; medium acid; clear smooth boundary.

Bt2—23 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; continuous thin dark brown (10YR 3/3) clay films on faces of peds; common thin light gray (10YR 7/2) silt coatings on faces of peds when dry; strongly acid; clear smooth boundary.

Bt3—30 to 45 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; friable; few fine roots; many thin dark brown (10YR 3/3) clay films on faces of peds; common thin light gray (10YR 7/2) silt coatings on faces of peds when dry; strongly acid; clear smooth boundary.

BC—45 to 61 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct grayish brown (10YR 5/2) mottles; weak medium prismatic structure; friable; few fine roots; few thin dark brown (10YR 3/3) organic coatings on faces of peds; medium acid; clear smooth boundary.

C—61 to 65 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; massive; friable; few fine roots; few fine dark stains (iron and manganese oxides); medium acid.

The thickness of the solum ranges from 50 to about 70 inches. The Ap horizon is 5 to 10 inches thick. Pedons in uncultivated areas have an E horizon. The B horizon has value of 4 or 5. The C horizon is medium acid or slightly acid.

Flanagan Series

The Flanagan series consists of deep, somewhat poorly drained soils on glacial till plains. These soils formed in 40 to 60 inches of loess and in the underlying calcareous, loamy till. They are moderately permeable in the upper part and moderately slowly permeable in the lower part. Slope ranges from 0 to 3 percent.

Flanagan soils are similar to Catlin and Elburn soils and are commonly adjacent to Catlin, Drummer, and Saybrook soils. The moderately well drained Catlin and Saybrook soils are on the higher parts of the landscape. Saybrook soils formed in less than 40 inches of loess and in the underlying till. The poorly drained Drummer soils are in drainageways or slightly depressional areas. They do not have an argillic horizon. Elburn soils are stratified in the lower part of the solum.

Typical pedon of Flanagan silt loam, 0 to 3 percent slopes, in a cultivated field; 2,610 feet north and 722 feet west of the southeast corner of sec. 1, T. 37 N., R. 2 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—8 to 14 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—14 to 19 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; many thin very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—19 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—29 to 41 inches; brown (10YR 5/3) silty clay loam; common fine faint yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear smooth boundary.

2BC—41 to 56 inches; dark yellowish brown (10YR 4/4) clay loam; common fine faint strong brown (7.5YR 5/8) and few fine faint grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; very dark grayish brown (10YR 3/2) krotovinas; about 5 percent pebbles, 2 to 10 millimeters in diameter; neutral; clear smooth boundary.

2C—56 to 60 inches; light yellowish brown (10YR 6/4) loam; common fine distinct yellowish brown (10YR 5/6 and 10YR 5/8) mottles; massive; friable; about 5 percent pebbles, 2 to 10 millimeters in diameter; mildly alkaline; slight effervescence.

The thickness of the solum ranges from 50 to 60 inches. The mollic epipedon is 12 to 15 inches thick.

The A horizon has value of 2 or 3 and chroma of 1 or 2. In some pedons it is silty clay loam in the lower part. The Bt horizon has chroma of 2 to 4. The 2BC horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 6. It is silt loam, loam, or clay loam. It is neutral or mildly alkaline. The 2C horizon has hue of 10YR or 7.5YR and value of 4 to 6. It is commonly loam, but the range includes silt loam.

Friesland Series

The Friesland series consists of deep, well drained, moderately permeable soils on uplands. These soils

formed in loamy eolian sediments and in the underlying silty sediments. Slope ranges from 1 to 4 percent.

Friesland soils are similar to Ayr soils and commonly are adjacent to Chelsea, Dickinson, La Hogue, and Parr soils. Ayr soils contain more sand in the lower part of the solum than the Friesland soils. Chelsea soils contain more sand throughout the solum than the Friesland soils. They are in the higher landscape positions. Dickinson soils have a texture of sandy loam or loamy sand to a depth of 40 inches. They are in positions on the landscape similar to those of the Friesland soils. La Hogue soils are somewhat poorly drained and are on the lower parts of the landscape. Parr soils contain more sand in the lower part of the solum than the Friesland soils. They are in positions on the landscape similar to those of the Friesland soils.

Typical pedon of Friesland fine sandy loam, 1 to 4 percent slopes, 2,496 feet west and 586 feet north of the southeast corner of sec. 14, T. 20 N., R. 11 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) fine sandy loam, grayish brown (10YR 5/2) dry; weak medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—7 to 14 inches; very dark gray (10YR 3/1) fine sandy loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

AB—14 to 18 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; friable; few fine roots; common thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—18 to 26 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; few fine roots; common thin dark brown (10YR 3/3) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt2—26 to 34 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; few fine roots; common thin brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

2Bt3—34 to 45 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few thin brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt4—45 to 50 inches; yellowish brown (10YR 5/4) silt loam; few fine faint yellowish brown (10YR 5/8) and few fine faint brown (10YR 5/3) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few thin brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2BC—50 to 60 inches; yellowish brown (10YR 5/4) silt loam; few fine faint yellowish brown (10YR 5/8) and brown (10YR 5/3) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; slightly acid; clear smooth boundary.

The thickness of the solum ranges from 50 to 70 inches. The thickness of the loamy eolian deposits ranges from 20 to 30 inches. The mollic epipedon is 10 to 20 inches thick.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is dominantly fine sandy loam in the upper part, but the range includes loam. The 2B horizon has chroma of 4 to 6. Some pedons do not have a 2BC horizon.

Gilford Series

The Gilford series consists of deep, very poorly drained, moderately rapidly permeable soils on outwash plains that are subject to flooding. These soils formed in loamy glacial outwash. Slope ranges from 0 to 2 percent.

The Gilford soils in this county are subject to shallow flooding, which is not definitive for the Gilford series. This difference, however, does not significantly affect the use or behavior of the soils.

Gilford soils are similar to Selma soils and are commonly adjacent to Hoopeston and Selma soils. Selma soils contain more clay in the solum than the Gilford soils. They are in positions on the landscape similar to those of the Gilford soils. Hoopeston soils are somewhat poorly drained and are on the slightly higher parts of the landscape.

Typical pedon of Gilford fine sandy loam, 1,200 feet north and 120 feet west of the southeast corner of sec. 2, T. 19 N., R. 8 E.

Ap—0 to 10 inches; black (N 2/0) fine sandy loam; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—10 to 18 inches; very dark gray (10YR 3/1) fine sandy loam; common fine prominent reddish brown (5YR 4/4) and common medium prominent yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure parting to moderate fine granular; friable; common moderately thick black (10YR 2/1) coatings on faces of peds; slightly acid; clear smooth boundary.

AB—18 to 23 inches; very dark gray (10YR 3/1) fine sandy loam; common medium prominent yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable; few moderately thick black (10YR 2/1) coatings on faces of peds; slightly acid; clear smooth boundary.

Bg—23 to 36 inches; dark gray (10YR 4/1) sandy loam; common medium prominent reddish brown (5YR 4/4) and few fine prominent yellowish red (5YR 5/8)

mottles; weak medium subangular blocky structure; very friable; few moderately thick black (10YR 2/1) coatings on faces of peds; slightly acid; clear smooth boundary.

BCg—36 to 40 inches; dark gray (10YR 4/1) sandy loam; few fine faint light brownish gray (10YR 6/2) and few fine faint brownish yellow (10YR 6/6) mottles; weak medium subangular blocky structure; very friable; common moderately thick black (10YR 2/1) coatings on faces of peds; slightly acid; clear smooth boundary.

2Cg—40 to 60 inches; light brownish gray (10YR 6/2) sand; single grain; loose; neutral.

The solum ranges from 36 to 40 inches in thickness. It is slightly acid or neutral. The thickness of the mollic epipedon ranges from 10 to 24 inches.

The A and AB horizons have chroma of 2 or less. They are typically fine sandy loam but in some pedons are loam. The B horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. In some pedons it has thin layers of loam or sandy clay loam. The 2Cg horizon has hue of 10YR or 2.5Y. In some pedons it has strata of gravelly sand. It is neutral or mildly alkaline.

Griswold Series

The Griswold series consists of deep, well drained, moderately permeable soils on till plains. These soils formed in sandy loam glacial till. Slope ranges from 5 to 15 percent.

The Griswold soils in this county have a thinner dark surface layer than is definitive for Griswold series. This difference, however, does not significantly affect the use or behavior of the soils.

Griswold soils are similar to Jasper and Parr soils and are commonly adjacent to Jasper, Parr, and Rodman soils. Parr soils contain less sand in the lower part of the solum and the C horizon than the Griswold soils. Also, they are higher on the landscape. Jasper soils are lower on the landscape than the Griswold soils. Also, they have a thicker solum. Rodman soils formed in sand and gravel. They are in positions on the landscape similar to those of the Griswold soils.

Typical pedon of Griswold loam, 5 to 10 percent slopes, eroded, 1,146 feet east and 720 feet south of the northwest corner of sec. 29, T. 22 N., R. 10 E.

Ap—0 to 7 inches; mixed very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; few fine roots; few small pebbles; neutral; abrupt smooth boundary.

Bt1—7 to 12 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; common thin very dark grayish brown (10YR 3/2) clay films on faces of peds; few small pebbles; neutral; clear smooth boundary.

Bt2—12 to 16 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; few thin dark brown (10YR 4/3) clay films on faces of peds; few small pebbles; neutral; clear smooth boundary.

Bt3—16 to 22 inches; dark yellowish brown (10YR 4/4) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; few thin yellowish brown (10YR 5/4) clay films on faces of peds; few small pebbles; slightly acid; clear smooth boundary.

Bt4—22 to 29 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few small pebbles; neutral; clear smooth boundary.

Bt5—29 to 34 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; few fine roots; few thin yellowish brown (10YR 5/4) clay films on faces of peds; few small pebbles; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

C1—34 to 42 inches; brownish yellow (10YR 6/6) sandy loam; massive; friable; few fine roots; few small pebbles; few fine dark concretions (iron and manganese oxides); slight effervescence; mildly alkaline; clear smooth boundary.

C2—42 to 60 inches; light yellowish brown (10YR 6/4) sandy loam; massive; friable; few small pebbles; few fine dark concretions (iron and manganese oxides); strong effervescence; mildly alkaline.

The thickness of the solum ranges from 24 to 36 inches. The dark surface layer is 6 to 9 inches thick.

The A horizon has value and chroma of 2 to 4. It typically is loam but in some pedons is sandy loam. The B horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 or 5.

Harpster Series

The Harpster series consists of deep, poorly drained, moderately permeable soils on outwash plains and lake plains. These soils formed in calcareous, silty sediments. Slope ranges from 0 to 2 percent.

The Harpster soils in this county have a slightly lower content of free carbonates than is definitive for the Harpster series. This difference, however, does not significantly affect the use or behavior of the soils.

Harpster soils are similar to Canisteo soils and are commonly adjacent to Canisteo, Drummer, and Hartsburg soils. Canisteo soils contain more sand throughout the solum than the Harpster soils. Drummer soils do not have carbonates within a depth of 40 inches. Hartsburg soils do not have carbonates within a

depth of 15 inches. Canisteo and Hartsburg soils are in positions on the landscape similar to those of the Harpster soils that are subject to flooding. Drummer soils are in positions on the landscape similar to those of the Harpster soils that are not subject to flooding.

Typical pedon of Harpster silty clay loam, 3,035 feet north and 50 feet east of the southwest corner of sec. 10, T. 39 N., R. 1 E.

Ap—0 to 9 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak coarse granular structure; friable; many small snail shell fragments; violent effervescence; mildly alkaline; abrupt smooth boundary.

Ak—9 to 13 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; weak medium subangular blocky structure parting to moderate fine granular; friable; few small snail shell fragments; strong effervescence; mildly alkaline; clear smooth boundary.

Bkg1—13 to 18 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure parting to moderate fine subangular blocky; friable; slight effervescence; mildly alkaline; clear smooth boundary.

Bkg2—18 to 30 inches; olive gray (5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak coarse angular blocky structure parting to moderate medium angular blocky; friable; a 1-inch black (10YR 2/1) krotovina in the upper part; slight effervescence; mildly alkaline; abrupt smooth boundary.

Bkg3—30 to 35 inches; gray (10YR 5/1) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure; friable; few moderately thick dark grayish brown (10YR 4/2) coatings on vertical faces of peds; few fine light colored concretions (calcium carbonate); few small snail shells; slight effervescence; mildly alkaline; clear smooth boundary.

Bkg4—35 to 42 inches; gray (5Y 5/1) silt loam; few fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure; friable; few moderately thick grayish brown (10YR 5/2) coatings on vertical faces of peds; common fine light colored concretions (calcium carbonate); slight effervescence; mildly alkaline; clear smooth boundary.

Ckg1—42 to 56 inches; gray (5Y 5/1) silt loam; many fine prominent yellowish brown (10YR 5/6) and few medium prominent yellowish red (5YR 5/6) mottles; weak coarse prismatic structure; friable; common fine light colored concretions (calcium carbonate); violent effervescence; moderately alkaline; abrupt smooth boundary.

Ckg2—56 to 70 inches; gray (5Y 5/1) silt loam; few fine coarse yellowish brown (10YR 5/6) mottles; massive; friable; violent effervescence; moderately alkaline.

The solum is 40 to 46 inches thick. The mollic epipedon is 12 to 20 inches thick.

The A horizon has chroma of 0 or 1. It is typically silty clay loam but is silt loam in some pedons. The Bkg horizon has value of 4 to 6. The C horizon has hue of 5Y or 10YR, value of 5 or 6, and chroma of 1 to 8. It typically is silt loam but in some pedons is loam. In some pedons strata of sandy loam are below a depth of 40 inches.

Hartsburg Series

The Hartsburg series consists of deep, poorly drained, moderately permeable soils on lake plains. These soils formed in loess. Slope ranges from 0 to 2 percent.

Hartsburg soils are similar to Drummer soils and are commonly adjacent to Canisteo and Harpster soils. Drummer soils do not have carbonates within a depth of 40 inches. Canisteo soils have carbonates within 10 inches of the surface. They contain more sand throughout than the Hartsburg soils. Harpster soils have a calcic horizon. Canisteo and Harpster soils are in positions on the landscape similar to those of the Hartsburg soils.

Typical pedon of Hartsburg silty clay loam, 1,720 feet north and 230 feet east of the southwest corner of sec. 17, T. 38 N., R. 1 E.

Ap—0 to 8 inches; black (N 2/0) silty clay loam, dark grayish brown (10YR 4/2) dry; weak very fine and fine granular structure; friable; neutral; abrupt smooth boundary.

A—8 to 12 inches; black (N 2/0) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; mildly alkaline; clear smooth boundary.

AB—12 to 16 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; mildly alkaline; clear smooth boundary.

Bg—16 to 21 inches; dark gray (10YR 4/1) silty clay loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak fine subangular blocky structure; friable; common thin very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); mildly alkaline; clear smooth boundary.

Bkg1—21 to 33 inches; dark gray (10YR 4/1) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; common thin very dark gray (10YR 3/1) organic

coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slight effervescence; mildly alkaline; clear smooth boundary.

Bkg2—33 to 41 inches; olive gray (5Y 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; few fine dark concretions (iron and manganese oxides); few fine carbonate concretions; dark krotovinas between depths of 32 and 38 inches; slight effervescence; mildly alkaline; clear smooth boundary.

BCkg—41 to 48 inches; olive gray (5Y 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine carbonate concretions; small dark krotovinas; slight effervescence; mildly alkaline; clear smooth boundary.

Ckg—48 to 60 inches; olive gray (5Y 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/4) mottles; massive; friable; few fine carbonate concretions; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 38 to 48 inches. The depth to free carbonates ranges from 15 to 35 inches. The mollic epipedon is 11 to 20 inches thick.

The A and AB horizons are typically silty clay loam but in some pedons are silt loam. The B horizon has hue of 10YR, 5Y, or 2.5Y. Some pedons do not have concretions.

Hitt Series

The Hitt series consists of deep, well drained soils on uplands that are underlain by bedrock. These soils formed in eolian sediments, glacial drift, and material weathered from limestone bedrock. Permeability is moderate in the loamy part of the solum and slow in the clayey residuum above the bedrock. Slope ranges from 2 to 5 percent.

The Hitt soils in this county have a slightly thinner surface layer than is definitive for the Hitt series. This difference, however, does not significantly affect the use or behavior of the soils.

Hitt soils are similar to Jasper and Rockton soils and are commonly adjacent to Jasper, Rockton, and Sogn soils. Jasper soils do not have lithic contact within a depth of 60 inches. They are in positions on the landscape similar to those of the Hitt soils. Rockton soils have lithic contact within a depth of 40 inches. They are commonly downslope from the Hitt soils. Sogn soils have lithic contact within a depth of 20 inches. They are on the more sloping parts of the landscape.

Typical pedon of Hitt loam, 2 to 5 percent slopes, eroded, 2,202 feet south and 270 feet west of the northeast corner of sec. 22, T. 22 N., R. 11 E.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) loam, brown (10YR 5/3) dry; moderate medium granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—8 to 16 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; continuous thin dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—16 to 32 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; continuous thin brown (7.5YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt3—32 to 46 inches; reddish brown (5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin reddish brown (5YR 4/4) clay films on faces of peds; medium acid; clear smooth boundary.

3Bt4—46 to 54 inches; reddish brown (2.5YR 4/4) clay; moderate medium subangular blocky structure; firm; few fine roots; common thin yellowish red (5YR 4/6) clay films on faces of peds; slightly acid; abrupt smooth boundary.

3R—54 inches; limestone bedrock.

The thickness of the solum ranges from 40 to 60 inches and is the same as the depth to lithic contact. The dark surface layer is 6 to 9 inches thick.

The B horizon has value of 4 or 5 and chroma of 3 or 4. It is loam or clay loam. The 2B horizon has hue of 2.5YR or 5YR and chroma of 4 or 5. It is sandy clay loam or clay loam. The 3B horizon has hue of 2.5YR or 7.5YR.

Hoopeston Series

The Hoopeston series consists of deep, somewhat poorly drained soils on outwash plains. These soils formed in loamy sediments overlying sandy sediments. Permeability is moderately rapid in the solum and rapid in the substratum. Slope ranges from 0 to 2 percent.

Hoopeston soils are similar to La Hogue soils and are commonly adjacent to Gilford, La Hogue, and Selma soils. The very poorly drained Gilford soils are in the slightly lower landscape positions. La Hogue soils contain more clay in the solum than the Hoopeston soils. They are in positions on the landscape similar to those of the Hoopeston soils. The poorly drained Selma soils are slightly lower on the landscape than the Hoopeston soils. Also, they contain more clay in the solum.

Typical pedon of Hoopeston fine sandy loam, 195 feet south and 918 feet east of the center of sec. 33, T. 20 N., R. 9 E.

Ap—0 to 10 inches; black (10YR 2/1) fine sandy loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

AB—10 to 18 inches; very dark grayish brown (10YR 3/2) fine sandy loam, dark grayish brown (10YR 4/2) dry; common fine faint brown (10YR 4/3) mottles; moderate fine subangular blocky structure; very friable; few fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bw1—18 to 26 inches; yellowish brown (10YR 5/4) fine sandy loam; many medium faint yellowish brown (10YR 5/8) and common fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bw2—26 to 32 inches; light brownish gray (10YR 6/2) fine sandy loam; common fine distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

C—32 to 60 inches; pale brown (10YR 6/3) sand; single grain; loose; neutral.

The thickness of the solum ranges from 32 to 44 inches. The mollic epipedon is 12 to 18 inches thick.

The B horizon is typically fine sandy loam. In some pedons, however, it is sandy loam, and in others it has a loam subhorizon less than 6 inches thick. It is slightly acid to strongly acid.

Houghton Series

The Houghton series consists of deep, very poorly drained soils on outwash plains and till plains. These soils formed in herbaceous organic deposits more than 51 inches thick. Permeability is moderately slow to moderately rapid. Slope is less than 2 percent.

Houghton soils are similar to Adrian soils and are commonly adjacent to Comfrey and Sable soils. Adrian soils have a mineral substratum within a depth of 51 inches. Comfrey and Sable soils formed in mineral material. They are on the slightly higher parts of the landscape.

Typical pedon of Houghton muck, in a cultivated field; 144 feet south and 2,600 feet east of the northwest corner of sec. 12, T. 37 N., R. 3 E.

Oap—0 to 8 inches; black (N 2/0) rubbed sapric material; about 15 percent fiber, 5 percent rubbed; weak fine granular structure; very friable; few fine roots; slightly acid; abrupt smooth boundary.

Oa1—8 to 17 inches; black (N 2/0) rubbed sapric material; about 15 percent fiber, 5 percent rubbed; weak fine subangular blocky structure; very friable; few fine roots; slightly acid; clear smooth boundary.

Oa2—17 to 23 inches; black (N 2/0) rubbed sapric material; about 15 percent fiber, 5 percent rubbed; moderate medium subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

Oa3—23 to 37 inches; black (N 2/0) rubbed sapric material; about 15 percent fiber, 5 percent rubbed; weak medium subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

Oa4—37 to 60 inches; black (N 2/0) rubbed sapric material; about 15 percent fiber, 5 percent rubbed; massive; friable; few fine roots; neutral.

The sapric material is more than 51 inches thick. Some pedons have woody fragments, which cannot be crushed between the fingers. Reaction is slightly acid or neutral throughout the profile. The subsurface tiers are dominantly sapric material, but some pedons have thin strata of hemic and fibric material.

Jasper Series

The Jasper series consists of deep, well drained, moderately permeable soils on outwash plains. These soils formed in loamy and silty eolian material and in the underlying silty or loamy outwash. Slope ranges from 0 to 10 percent.

Jasper soils are similar to Tama soils and are commonly adjacent to La Hogue, Nachusa, Rockton, and Vanpetten soils. Tama soils contain less sand in the solum than the Jasper soils. La Hogue and Nachusa soils are somewhat poorly drained and are on the slightly lower parts of the landscape. Rockton soils have bedrock within a depth of 40 inches. They are in positions on the landscape similar to those of the Jasper soils. Vanpetten soils have contrasting partical-size classes within a depth of 40 inches. They are in positions on the landscape similar to those of the Jasper soils.

Typical pedon of Jasper silt loam, 2 to 5 percent slopes, 114 feet west and 1,530 feet north of the southeast corner of sec. 30, T. 22 N., R. 11 E.

Ap—0 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; few fine roots; neutral; clear smooth boundary.

AB—11 to 15 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure; friable; few fine roots; many thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—15 to 21 inches; dark yellowish brown (10YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; many thin brown (10YR 4/3) clay films on faces of peds and few thin dark brown (10YR 3/3) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt2—21 to 26 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many thin brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt3—26 to 36 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common thin brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt4—36 to 45 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common thin brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; gradual smooth boundary.

C—45 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure; friable; few fine dark concretions (iron and manganese oxides); neutral.

The solum is 40 to 48 inches thick. The mollic epipedon is 10 to 18 inches thick.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is typically silt loam but in some pedons is loam or, less commonly, fine sandy loam. The B horizon has value of 4 or 5 and chroma of 4 to 6. It commonly has thin subhorizons of loam and fine sandy loam. It is strongly acid to neutral. The C horizon typically is silt loam but in some pedons has thin strata of fine sandy loam, fine sand, or gravelly coarse sand. It is medium acid to mildly alkaline.

Jasper silt loam, 5 to 10 percent slopes, eroded, has a slightly thinner surface layer than is definitive for the Jasper series. This difference, however, does not significantly affect the use or behavior of the soil.

Kidder Series

The Kidder series consists of deep, well drained soils on dissected till plains. These soils formed in less than 15 inches of loess and in the underlying calcareous sandy loam till. Permeability is moderate in the solum and moderately rapid in the substratum. Slope ranges from 10 to 15 percent.

Kidder soils are similar to Griswold soils and are commonly adjacent to Birkbeck, Griswold, and Miami soils. Birkbeck soils are upslope from the Kidder soils. They formed in 40 to 60 inches of loess and in the underlying loamy till. Griswold and Miami soils are in positions on the landscape similar to those of the Kidder soils. Griswold soils have a mollic epipedon. Miami soils formed in loess and in the underlying calcareous, loamy till.

Typical pedon of Kidder silt loam, 10 to 15 percent slopes, eroded, 580 feet west and 2,440 feet south of the northeast corner of sec. 18, T. 22 N., R. 9 E.

Ap—0 to 7 inches; mixed dark brown (10YR 4/3) and yellowish brown (10YR 5/6) silt loam, pale brown (10YR 6/3) dry; moderate very fine subangular blocky structure; friable; few fine roots; neutral; abrupt smooth boundary.

Bt1—7 to 15 inches; brown (7.5YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; many thin dark brown (7.5YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—15 to 21 inches; brown (7.5YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; many thin dark brown (7.5YR 4/4) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.

Bt3—21 to 28 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin dark brown (7.5YR 4/4) clay films on faces of peds; few pebbles; slightly acid; clear smooth boundary.

Bt4—28 to 37 inches; strong brown (7.5YR 5/4) sandy loam; moderate medium subangular blocky structure; friable; few fine roots; few thin dark brown (7.5YR 4/4) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); few pebbles; medium acid; clear smooth boundary.

C—37 to 60 inches; brownish yellow (10YR 6/6) sandy loam; massive; friable; common pebbles; slight effervescence; mildly alkaline.

The thickness of the solum and the depth to free carbonates range from 20 to 40 inches. The Ap horizon has value of 3 or 4 (more than 5.5 dry) and chroma of 2 or 3. Pedons in uncultivated areas have an E horizon. This horizon is dominantly silt loam but is loam in some pedons. The B horizon has hue of 7.5YR or 10YR and value and chroma of 4 to 6. It is clay loam, loam, or sandy clay loam. The solum typically is slightly acid or neutral but in some pedons ranges to medium acid in one or more of the horizons.

La Hogue Series

The La Hogue series consists of deep, somewhat poorly drained soils on outwash plains. These soils formed in loamy sediments and in the underlying stratified, loamy and sandy material. Permeability is

moderate in the solum and moderately rapid in the substratum. Slope ranges from 0 to 2 percent.

La Hogue soils are similar to Elburn and Odell soils and are commonly adjacent to Jasper, Selma, and Waukee soils. Elburn soils contain less sand in the control section than the La Hogue soils. The well drained Jasper soils are in the higher landscape positions. Odell soils contain more clay in the lower part of the B horizon than the La Hogue soils and are underlain by loam glacial till. The poorly drained Selma soils are in the slightly lower areas. The well drained Waukee soils are in the higher landscape positions. They do not have an argillic horizon and have contrasting particle-size classes within a depth of 40 inches.

Typical pedon of La Hogue loam, 1,530 feet south and 678 feet west of the center of sec. 28, T. 21 N., R. 8 E.

Ap—0 to 11 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

A—11 to 18 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; slightly acid; clear smooth boundary.

BA—18 to 23 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure; friable; few fine roots; few thin black (10YR 2/1) organic coatings on faces of peds; few brown (10YR 5/3) worm casts; few pebbles, 5 millimeters in diameter; slightly acid; clear smooth boundary.

Bt1—23 to 29 inches; brown (10YR 5/3) loam; common fine faint grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) and few fine prominent strong brown (7.5YR 5/8) mottles; moderate fine subangular blocky structure; friable; few fine roots; few thin very dark gray (10YR 3/1) clay films on faces of peds; few pebbles, 10 millimeters in diameter; strongly acid; clear smooth boundary.

Bt2—29 to 34 inches; grayish brown (10YR 5/2) silty clay loam; few fine prominent strong brown (7.5YR 5/8) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt3—34 to 38 inches; grayish brown (10YR 5/2) clay loam; few fine prominent strong brown (7.5YR 5/8) mottles; weak fine subangular blocky structure; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

BC—38 to 41 inches; grayish brown (10YR 5/2) sandy loam; few fine prominent strong brown (7.5YR 5/8) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; slightly acid; clear smooth boundary.

C1—41 to 55 inches; mottled strong brown (7.5YR 5/8) and light brownish gray (10YR 6/2) loamy sand; single grain; loose; few pebbles, 2 to 10 millimeters in diameter; slightly acid; gradual smooth boundary.

C2—55 to 60 inches; mottled brown (10YR 5/3) and yellowish brown (10YR 5/8) sand; single grain; loose; few pebbles, 2 to 10 millimeters in diameter; neutral.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 10 to 23 inches.

The A horizon typically is loam but in some pedons is silt loam or sandy loam. Some pedons have an AB horizon. The Bt horizon generally has hue of 10YR but in some pedons grades to 2.5Y or 5Y in the lower part. It has value of 4 to 6 and chroma of 2 to 6. It ranges from strongly acid to neutral. The BC horizon has hue of 10YR, 7.5YR, 2.5Y, or 5Y. It is dominantly sandy loam or loamy sand. In some pedons, however, it has strata of clay loam or silt loam.

La Rose Series

The La Rose series consists of deep, well drained, moderately permeable soils on glacial till plains. These soils formed in less than 10 inches of silty material and in the underlying loam glacial till. Slope ranges from 2 to 10 percent.

La Rose soils are similar to Parr soils and are commonly adjacent to Flanagan, Parr, and Saybrook soils. Their solum is thinner than that of the adjacent soils. Parr and Saybrook soils are generally upslope from the La Rose soils. They have loess in the upper part of the solum. The somewhat poorly drained Flanagan soils are in shallow depressions and drainageways. They formed in 40 to 60 inches of loess.

Typical pedon of La Rose loam, 5 to 10 percent slopes, eroded, 2,342 feet north and 113 feet east of the southwest corner of sec. 33, T. 38 N., R. 2 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few fine roots; few brown (7.5YR 4/4) peds of Bt material mixed throughout; few pebbles; neutral; abrupt smooth boundary.

Bt1—7 to 14 inches; brown (7.5YR 4/4) clay loam; moderate fine subangular blocky structure; friable; few fine roots; common thin dark brown (10YR 3/3) clay films on faces of peds; common thin very dark grayish brown (10YR 3/2) channel coatings; few pebbles; neutral; clear smooth boundary.

Bt2—14 to 19 inches; brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin very dark grayish brown (10YR 3/2) channel coatings; few pebbles; neutral; clear smooth boundary.

C1—19 to 42 inches; brown (7.5YR 5/4) loam; few fine faint strong brown (7.5YR 5/8) mottles; massive; firm; few pebbles; strong effervescence; mildly alkaline; gradual smooth boundary.

C2—42 to 60 inches; brown (7.5YR 5/4) loam; few fine faint strong brown (7.5YR 5/8) mottles; massive; firm; few pebbles; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 13 to 24 inches and is commonly the same as the depth to free carbonates. The mollic epipedon is 7 to 9 inches thick.

The Ap horizon typically is loam but in some pedons is silt loam. Some pedons have a BA horizon. The Bt horizon has hue of 10YR or 7.5YR and value of 4 or 5. It is slightly acid to mildly alkaline. Some pedons have a BC horizon. The C horizon has hue of 10YR or 7.5YR.

Lawson Series

The Lawson series consists of deep, somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slope ranges from 0 to 2 percent.

Lawson soils are similar to Comfrey and Otter soils and are commonly adjacent to Comfrey, Millington, Otter, and Ross soils. In Comfrey, Millington, and Ross soils, the content of sand in the 10- to 40-inch control section is 15 percent or more. Comfrey and Otter soils are poorly drained and are on the slightly lower parts of the landscape. Millington soils are calcareous. They are in old channels that are frequently flooded. Ross soils are well drained and are on the higher parts of the flood plain that are subject to rare flooding.

Typical pedon of Lawson silt loam, in a cultivated field about 5 miles northwest of Dixon; 1,200 feet west and 561 feet north of the southeast corner of sec. 16, T. 22 N., R. 8 E.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few fine roots; common thin light gray (10YR 7/2) silt coatings on faces of peds when dry; few fine yellowish red (10YR 5/8) concretions (iron and manganese oxides); neutral; clear smooth boundary.

A1—9 to 18 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

A2—18 to 29 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

A3—29 to 35 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; common medium faint black (10YR 2/1) mottles; moderate fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

C1—35 to 40 inches; dark grayish brown (10YR 4/2) silt loam; weak fine subangular blocky structure; friable; few fine roots; common thin very dark brown (10YR 2/2) coatings on faces of peds; few thin light gray (10YR 7/1) silt coatings on faces of peds when dry; slightly acid; clear smooth boundary.

C2—40 to 56 inches; grayish brown (10YR 5/2) silt loam; common medium prominent brown (7.5YR 4/4) mottles; weak fine subangular blocky structure; friable; many thin very dark gray (10YR 3/1) coatings on faces of peds; continuous thin light gray (10YR 7/1) silt coatings on faces of peds when dry; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

C3—56 to 60 inches; grayish brown (10YR 5/2) silt loam; common medium prominent brown (7.5YR 4/4) mottles; weak fine subangular blocky structure; friable; continuous light gray (10YR 7/1) silt coatings on faces of peds when dry; few fine dark concretions (iron and manganese oxides); slightly acid.

The thickness of the mollic epipedon ranges from 30 to 36 inches. In some pedons thin lenses of very fine sand are between depths of 30 and 40 inches.

Martinsville Series

The Martinsville series consists of deep, well drained, moderately permeable soils on terraces. These soils formed in a thin layer of loess and in the underlying stratified, loamy sediments. Slope ranges from 0 to 15 percent.

Martinsville soils are similar to Jasper, Miami, and St. Charles soils and are commonly adjacent to Billett, St. Charles, and Waukee soils. Billett soils are on dunal uplands and terraces. They are coarse-loamy. Their surface layer is darker than that of the Martinsville soils. Jasper soils have a mollic epipedon. The solum of Miami soils is thinner than that of the Martinsville soils, and the substratum is loam till. St. Charles and Waukee soils are in positions on the landscape similar to those of the Martinsville soils. St. Charles soils formed in more than 40 inches of loess. Waukee soils have a mollic epipedon and have contrasting textures within a depth of 40 inches.

Typical pedon of Martinsville silt loam, 0 to 2 percent slopes, 900 feet west and 1,992 feet south of the northeast corner of sec. 13, T. 22 N., R. 9 E.

Ap—0 to 5 inches; dark brown (10YR 3/3) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

E—5 to 11 inches; brown (10YR 4/3) silt loam; moderate medium platy structure; friable; few fine roots; common thin dark brown (10YR 3/3) organic coatings on faces of peds; neutral; abrupt smooth boundary.

Bt1—11 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; many thin brown (10YR 4/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt2—16 to 27 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; few fine roots; few thin dark brown (10YR 3/3) organic coatings on faces of peds; many thin brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt3—27 to 36 inches; dark yellowish brown (10YR 4/4) loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; few thin brown (10YR 4/3) clay films on faces of peds; very dark grayish brown (10YR 3/2) channel fillings; about 2 percent pebbles, 5 to 10 millimeters in size; strongly acid; clear smooth boundary.

2Bt4—36 to 54 inches; dark yellowish brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; few fine roots; few thin dark brown (7.5YR 4/4) clay films on faces of peds; about 5 percent pebbles, 5 to 20 millimeters in size; slightly acid; clear smooth boundary.

3C—54 to 60 inches; yellowish brown (10YR 5/6) sand; single grain; loose; slightly acid.

The thickness of the solum ranges from 36 to 60 inches. The Ap horizon has value of 3 or 4 and chroma of 2 to 4. It is typically silt loam but in some pedons is loam or fine sandy loam. Pedons in uncultivated areas have an A horizon. In some pedons the E horizon is incorporated into the Ap horizon. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam, loam, sandy loam, or clay loam. The C horizon is stratified material ranging from sand to silt loam. In some pedons it has free carbonates.

Miami Series

The Miami series consists of deep, well drained, moderately permeable soils on till plains. These soils formed in as much as 18 inches of loess and in the underlying loamy glacial till. Slope ranges from 2 to 25 percent.

Miami soils are similar to Birkbeck, Kidder, and Martinsville soils and are commonly adjacent to Birkbeck, Kidder, and Whalan soils. Birkbeck soils are higher on the landscape than the Miami soils. Also, they have a thicker layer of loess over the till. Kidder soils have sandy loam within a depth of 40 inches. Martinsville soils are stratified in the lower part of the solum and the C horizon. Whalan soils are in positions on the landscape similar to those of the Miami soils. Their solum is underlain by limestone bedrock.

Typical pedon of Miami silt loam, 5 to 10 percent slopes, eroded, 1,845 feet east and 180 feet south of the northwest corner of sec. 3, T. 37 N., R. 1 E.

Ap—0 to 6 inches; mixed dark grayish brown (10YR 4/2) and dark yellowish brown (10YR 4/4) silt loam; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

2Bt1—6 to 15 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; strongly acid; clear smooth boundary.

2Bt2—15 to 26 inches; brown (7.5YR 5/4) clay loam; moderate fine subangular blocky structure; firm; few fine roots; many thin dark brown (7.5YR 4/2) clay films on faces of peds; few small pebbles; slightly acid; clear smooth boundary.

2C—26 to 60 inches; light brown (7.5YR 6/4) loam; massive; friable; few fine roots; few small pebbles; mildly alkaline.

The thickness of the solum ranges from 24 to 36 inches. The A horizon is typically silt loam and less commonly is loam or fine sandy loam. Uncultivated pedons have an E horizon. The 2B horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. It is typically clay loam but has subhorizons of silty clay loam, loam, and sandy loam in some pedons. It generally is slightly acid. The most acid part ranges to strongly acid, however, and some subhorizons are neutral or mildly alkaline. The 2C horizon has hue of 10YR or 7.5YR.

Milford Series

The Milford series consists of deep, poorly drained, moderately slowly permeable soils in depressions on lake plains. These soils formed in clayey and silty lacustrine sediments. Slope ranges from 0 to 2 percent.

Milford soils are similar to Drummer soils and are commonly adjacent to Canisteo, Gilford, and Selma soils. They are slightly lower on the landscape than the adjacent soils. Drummer soils contain less clay in the solum than the Milford soils. Canisteo soils have free carbonates throughout the solum. Also, their solum contains less clay than that of the Milford soils. Gilford soils contain less clay and more sand than the Milford soils. Selma soils contain less clay throughout the solum than the Milford soils.

Typical pedon of Milford silty clay loam, about 2,520 feet north and 408 feet west of the southeast corner of sec. 19, T. 19 N., R. 8 E.

Ap—0 to 10 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak medium granular structure; firm; few fine roots; neutral; clear smooth boundary.

A—10 to 16 inches; black (10YR 2/1) silty clay, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; firm; few fine roots; neutral; clear smooth boundary.

AB—16 to 23 inches; very dark gray (5Y 3/1) silty clay loam, gray (10YR 5/1) dry; many fine prominent strong brown (7.5YR 5/6) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; many thin black (10YR 2/1) coatings on faces of peds; neutral; clear smooth boundary.

Bg1—23 to 28 inches; dark gray (5Y 4/1) silty clay loam; many fine prominent strong brown (7.5YR 5/6) mottles; weak fine prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; neutral; clear smooth boundary.

Bg2—28 to 40 inches; dark gray (5Y 4/1) silty clay; few fine prominent brown (7.5YR 5/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; common thin very dark gray (5Y 3/1) coatings on faces of peds; a black (10YR 2/1) krotovina between depths of 31 and 33 inches; neutral; clear smooth boundary.

Bg3—40 to 49 inches; gray (5Y 5/1) silty clay; few fine prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; common thin very dark gray (5Y 3/1) coatings on faces of peds; neutral; clear smooth boundary.

Cg—49 to 60 inches; gray (5Y 5/1) silty clay; few fine prominent brown (7.5YR 5/4) mottles; massive; firm; few fine roots; few thin strata of sandy loam; neutral.

The thickness of the solum ranges from 36 to 60 inches. The mollic epipedon ranges from 13 to 24 inches in thickness.

The A horizon has chroma of 1 or less. The B horizon has hue of 2.5Y, 5Y, or 10YR, value of 4 to 6, and chroma of 1 or 2. It is typically neutral but in some pedons is mildly alkaline in the lower part. The C horizon is typically silty clay or silty clay loam but ranges to sandy loam and generally is stratified.

Millington Series

The Millington series consists of deep, poorly drained, moderately permeable soils on flood plains. These soils formed in stratified, calcareous alluvium. Slope is less than 2 percent.

The Millington soils in this county do not have mottles and colors that are definitive for the Millington series. This difference, however, does not significantly affect the use or behavior of the soils.

Millington soils are similar to Du Page soils and are commonly adjacent to Du Page, Lawson, and Ross soils. Du Page soils are moderately well drained. Lawson soils are fine-silty and are somewhat poorly drained. Du Page and Lawson soils are on the slightly higher parts of the landscape. Ross soils are well drained and are in the higher landscape positions that are subject to rare flooding. They are more acid in the solum than the Millington soils.

Typical pedon of Millington silty clay loam, 1,600 feet west and 940 feet south of the northeast corner of sec. 14, T. 22 N., R. 9 E.

A—0 to 12 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; few fine roots; mildly alkaline; slight effervescence; clear smooth boundary.

Bw1—12 to 22 inches; black (10YR 2/1) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium subangular blocky structure; friable; few fine roots; few snail shells; mildly alkaline; slight effervescence; clear smooth boundary.

Bw2—22 to 32 inches; black (10YR 2/1) clay loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; friable; few fine roots; noticeable sand; few snail shells; mildly alkaline; strong effervescence; clear smooth boundary.

Bw3—32 to 46 inches; black (10YR 2/1) loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; friable; few fine roots; noticeable sand; less than 2 percent pebbles, 3 to 10 millimeters in diameter; few snail shells; mildly alkaline; violent effervescence; clear smooth boundary.

Cg1—46 to 51 inches; very dark gray (10YR 3/1) loam, grayish brown (10YR 5/2) dry; massive; very friable; few fine roots; few snail shells; mildly alkaline; violent effervescence; abrupt smooth boundary.

Cg2—51 to 60 inches; very dark gray (10YR 3/1) stratified sandy loam and loam; massive; very friable; few fine roots; thin stratum of loamy sand at a depth of 53 inches; few snail shells; about 5 percent gravel; mildly alkaline; violent effervescence.

The thickness of the solum ranges from 31 to 46 inches. The mollic epipedon includes all of the A and B horizons.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is commonly silty clay loam, but the range includes silt loam and loam. The 10- to 40-inch control section averages more than 15 percent fine sand or coarser

sand. The C horizon ranges from loam or sandy loam to gravelly loam.

Morocco Series

The Morocco series consists of deep, somewhat poorly drained, rapidly permeable soils on outwash plains. These soils formed in sandy outwash. Slope ranges from 0 to 2 percent.

Morocco soils are similar to Chelsea and Hoopeston soils and are commonly adjacent to Chelsea, Gilford, Miami, and Orio soils. Chelsea soils are excessively drained and are on dunes. Gilford soils are coarse-loamy. They are very poorly drained and are in the lower landscape positions. Hoopeston soils have a mollic epipedon and are coarse-loamy. Miami soils are fine-loamy and formed in glacial till. They are well drained and are on the higher parts of the landscape. Orio soils are fine-loamy. They are in depressions.

Typical pedon of Morocco loamy fine sand, 822 feet west and 1,443 feet north of the southeast corner of sec. 28, T. 20 N., R. 10 E.

Ap—0 to 7 inches; dark brown (10YR 3/3) loamy fine sand, pale brown (10YR 6/3) dry; weak fine granular structure; very friable; few fine roots; medium acid; abrupt smooth boundary.

Bw1—7 to 16 inches; yellowish brown (10YR 5/4) loamy fine sand; common fine distinct yellowish red (5YR 5/6) and common fine faint brown (10YR 5/3) mottles; weak medium subangular blocky structure; very friable; few fine roots; very strongly acid; clear smooth boundary.

Bw2—16 to 23 inches; pale brown (10YR 6/3) sand; common fine distinct yellowish brown (10YR 5/6), few fine distinct yellowish red (5YR 5/6), and many medium faint light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; very friable; few fine roots; very strongly acid; clear smooth boundary.

Bw3—23 to 38 inches; light brownish gray (2.5Y 6/2) sand; few fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; very strongly acid; clear smooth boundary.

C—38 to 60 inches; yellowish brown (10YR 5/4) sand; common fine distinct yellowish red (5YR 5/6) and common medium prominent light brownish gray (2.5Y 6/2) mottles; single grain; loose; very strongly acid.

The thickness of the solum ranges from 36 to 48 inches. The A or Ap horizon is 6 to 9 inches thick.

The A or Ap horizon has chroma of 2 or 3. It is loamy fine sand or loamy sand. Some pedons have an E horizon. The Bw horizon has hue of 10YR, 7.5YR, or 2.5Y, value of 5 to 7, and chroma of 1 to 6. It is loamy fine sand, fine sand, or sand. It is medium acid to very strongly acid. The C horizon has hue of 10YR or 7.5YR, value of 5 to 8, and chroma of 1 to 6. It is medium acid to very strongly acid.

Muscatine Series

The Muscatine series consists of deep, somewhat poorly drained, moderately permeable soils on wide ridges and in broad low areas on uplands. These soils formed in loess. Slope ranges from 0 to 3 percent.

The Muscatine soils in this county have a larger clay increase between the A and B horizons than is definitive for the Muscatine series. This difference, however, does not significantly affect the use or behavior of the soils.

Muscatine soils are similar to Elburn and Tama soils and are commonly adjacent to Sable and Tama soils. Elburn soils contain more sand in the lower part of the solum than the Muscatine soils. Sable soils are poorly drained and are in shallow depressions and drainageways. Tama soils are moderately well drained and are upslope from the Muscatine soils.

Typical pedon of Muscatine silt loam, 0 to 3 percent slopes, about 2 miles south of Franklin Grove; 1,520 feet south and 600 feet east of the center of sec. 13, T. 21 N., R. 10 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

A—8 to 17 inches; very dark gray (10YR 3/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine granular structure; friable; few fine roots; medium acid; clear smooth boundary.

BA—17 to 22 inches; dark grayish brown (10YR 4/2) silty clay loam; moderate fine subangular blocky structure parting to fine granular; friable; common fine roots; continuous thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bt1—22 to 31 inches; grayish brown (10YR 5/2) silty clay loam; many fine distinct dark yellowish brown (10YR 4/6) mottles; moderate fine subangular blocky structure; friable; few fine roots; few thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; slightly acid; clear smooth boundary.

Bt2—31 to 40 inches; brown (10YR 5/3) silty clay loam; many fine distinct dark yellowish brown (10YR 4/6) and few fine faint grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate angular blocky; friable; few fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; few dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

BC—40 to 49 inches; grayish brown (10YR 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

C—49 to 60 inches; light brownish gray (10YR 6/2) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; mildly alkaline.

The solum ranges from 40 to 60 inches in thickness. It is medium acid to neutral. The mollic epipedon is 14 to 18 inches thick.

The A horizon is dominantly silt loam but in some subhorizons is silty clay loam. The Bt horizon has value of 4 to 6 and chroma of 2 to 4. The BC and C horizons have hue of 2.5Y or 5Y in some pedons. The C horizon has value of 5 or 6 and chroma of 1 or 2. In some pedons free carbonates are between depths of 48 and 60 inches.

Nachusa Series

The Nachusa series consists of deep, somewhat poorly drained, moderately slowly permeable soils on till plains. These soils formed in a thin layer of silty or loamy eolian material and in a loamy paleosol that formed in till. Slope ranges from 0 to 3 percent.

Nachusa soils are similar to Binghampton and Odell soils and are commonly adjacent to Clyde, Odell, and Prairieville soils. Clyde soils are poorly drained and are in drainageways. Odell soils are downslope from the Nachusa soils. Their solum is thinner than that of the Nachusa soils. Binghampton soils have coarser textured horizons than the Nachusa soils. Also, their dark surface layer is thinner. Prairieville soils are moderately well drained and are on the slightly higher parts of the landscape.

Typical pedon of Nachusa silt loam, in a cultivated field; 246 feet east and 952 feet north of the southwest corner of sec. 10, T. 20 N., R. 10 E.

Ap—0 to 11 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

BA—11 to 16 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure parting to moderate fine granular; friable; common fine roots; common thin dark gray (10YR 4/1) organic coatings on faces of peds; neutral; clear smooth boundary.

Bt1—16 to 23 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine faint yellowish brown (10YR 5/8) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; common fine roots; common thin dark gray (10YR 4/1) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

2Bt2—23 to 33 inches; yellowish brown (10YR 5/8) clay loam; few fine prominent grayish brown (2.5Y 5/2) and few fine faint strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; common fine roots; many thin dark gray (10YR 4/1) clay films on vertical faces of peds; common fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

2Bt3—33 to 46 inches; yellowish brown (10YR 5/8) clay loam; few fine prominent grayish brown (2.5Y 5/2) and strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; firm; few fine roots; few thin dark gray (10YR 4/1) clay films on vertical and horizontal faces of peds; thick gray (10YR 5/1) and very dark gray (10YR 3/1) fillings in root channels; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

2Bt4—46 to 60 inches; yellowish brown (10YR 5/8) loam that has lenses of sandy loam; common fine faint gray (10YR 6/1) mottles; weak coarse prismatic structure; friable; common thin gray (10YR 5/1) clay films on faces of peds; neutral.

The thickness of the solum ranges from 48 to 72 inches. The thickness of the silty or loamy eolian deposits ranges from 20 to 34 inches. The mollic epipedon is 10 to 16 inches thick.

The A horizon has value of 2 or 3 and chroma of 1 to 3. In some pedons it is loam. Some pedons do not have a BA horizon. The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. In some pedons it has subhorizons of clay loam or loam. It is very strongly acid to neutral. The 2B horizon typically has hue of 10YR or 7.5YR, but subhorizons range to 2.5Y or 5Y. This horizon has value of 4 to 6 and chroma of 2 to 8. In some pedons it has a thin subhorizon of clay. It is strongly acid to slightly acid in the upper part and mildly alkaline to slightly acid in the lower part. Some pedons have a 2C horizon.

Oakville Series

The Oakville series consists of deep, well drained, very rapidly permeable soils in dunelike areas on outwash plains. These soils formed in eolian sand. Slope ranges from 7 to 20 percent.

Oakville soils are similar to Chelsea and Sparta soils and are commonly adjacent to Chelsea, Dickinson, Morocco, Orio, and Sparta soils. Chelsea and Sparta soils are in positions on the landscape similar to those of the Oakville soils. Chelsea soils have lamallae within a depth of 60 inches. The surface layer of the Sparta soils is darker than that of the Oakville soils. Dickinson soils

are coarse-loamy and have a mollic epipedon. They are in positions on the landscape similar to or slightly lower than those of the Oakville soils. The somewhat poorly drained Morocco soils are in the lower landscape positions. The poorly drained Orio soils are in depressions or broad low areas. They have a mollic epipedon and are fine-loamy.

Typical pedon of Oakville fine sand, 7 to 20 percent slopes, severely eroded, 1,100 feet east and 550 feet south of the center of sec. 15, T. 21 N., R. 8 E.

A—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sand, pale brown (10YR 6/3) dry; single grain; loose; few fine roots; slightly acid; abrupt smooth boundary.
Bw—3 to 31 inches; dark yellowish brown (10YR 4/4) fine sand; very weak medium subangular blocky structure; very friable; very strongly acid; abrupt smooth boundary.
C—31 to 60 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; medium acid.

The thickness of the solum ranges from 22 to 45 inches. The A horizon is 3 to 6 inches thick. It has value of 3 to 6 and chroma of 2 to 4. It is typically fine sand but in some pedons is sand. It is neutral to medium acid. The B horizon has value and chroma of 4 to 6. It is typically fine sand but in some pedons is sand. It is neutral to very strongly acid. The C horizon is fine sand or sand. It has value and chroma of 4 to 6. It is neutral to medium acid.

Odell Series

The Odell series consists of deep, somewhat poorly drained, moderately slowly permeable soils on the lower parts of ridges and knobs on till plains. These soils formed in a thin layer of silty material and in the underlying loam glacial till. Slope ranges from 0 to 3 percent.

Odell soils are similar to Flanagan and Nachusa soils and are commonly adjacent to Clyde, Nachusa, Parr, and Prairieville soils. Clyde soils are poorly drained and are in the lower landscape positions. Flanagan soils contain more clay in the control section than the Odell soils. Also, their solum is thicker. Nachusa soils are higher on the landscape than the Odell soils. Also, their solum is thicker. The well drained Parr and moderately well drained Prairieville soils are in the slightly higher landscape positions.

Typical pedon of Odell silt loam, 0 to 3 percent slopes, 876 feet east and 312 feet south of the center of sec. 32, T. 21 N., R. 10 E.

Ap—0 to 7 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; slightly acid; abrupt smooth boundary.
A—7 to 11 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; slightly acid; clear smooth boundary.
AB—11 to 15 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; slightly acid; clear smooth boundary.
Bt1—15 to 20 inches; brown (10YR 4/3) silty clay loam; common fine faint grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; friable; many thin very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; clear smooth boundary.
2Bt2—20 to 29 inches; brown (10YR 4/3) clay loam; common fine faint grayish brown (10YR 5/2) and common fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; common thin very dark gray (10YR 3/1) clay films on faces of peds; few fine pebbles; neutral; clear smooth boundary.
2BC—29 to 40 inches; brown (10YR 5/3) loam; common medium faint yellowish brown (10YR 5/6) and few fine distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; few fine pebbles; slight effervescence; mildly alkaline; clear smooth boundary.
2C—40 to 60 inches; yellowish brown (10YR 5/4) loam; few fine distinct grayish brown (10YR 5/2) and common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine pebbles; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 34 to 42 inches. The depth to free carbonates ranges from 25 to 40 inches. The mollic epipedon is 12 to 16 inches thick.

The A horizon has chroma of 1 or 2. It is typically silt loam but in some pedons is loam. The 2BC horizon is neutral or mildly alkaline.

Orio Series

The Orio series consists of deep, poorly drained soils on outwash plains. These soils formed in loamy sediments and in the underlying sandy outwash. Permeability is moderately slow in the upper part of the profile and rapid in the lower part. Slope ranges from 0 to 2 percent.

The Orio soils in this county have a thicker dark surface layer than is definitive for the Orio series. Also, an abrupt textural change occurs between the E and the Btg horizons. These differences, however, do not significantly affect the use or behavior of the soils.

Orio soils are similar to Thorp Variant soils and are commonly adjacent to Chelsea, Dakota, and Sparta

soils. The adjacent soils do not have an albic horizon. Chelsea and Sparta soils are excessively drained and are on sand dunes. Their solum contains more sand than that of the Orio soils. Chelsea soils have an ochric epipedon. Dakota soils are well drained and are on dune-shaped ridges. The lower part of the solum in Thorp Variant soils contains more clay than that of the Orio soils. It formed in a clay loam paleosol.

Typical pedon of Orio sandy loam, 1,533 feet south and 150 feet west of the northeast corner of sec. 4, T. 19 N., R. 8 E.

Ap—0 to 11 inches; black (10YR 2/1) sandy loam, gray (10YR 5/1) dry; moderate fine granular structure; friable; common fine roots; medium acid; abrupt smooth boundary.

E1—11 to 15 inches; dark grayish brown (10YR 4/2) sandy loam, light gray (10YR 6/1) dry; moderate medium platy structure; friable; few fine roots; common thin very dark gray (10YR 3/1) coatings on faces of peds; medium acid; abrupt smooth boundary.

E2—15 to 21 inches; gray (10YR 6/1) sandy loam, light gray (10YR 7/1) dry; few fine faint yellowish brown (10YR 5/6) mottles; moderate medium platy structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Btg1—21 to 29 inches; dark gray (10YR 4/1) sandy clay loam; few fine distinct strong brown (7.5YR 5/8) and few fine faint gray (10YR 6/1) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; strongly acid; clear smooth boundary.

Btg2—29 to 37 inches; dark gray (10YR 4/1) sandy loam; common fine distinct strong brown (7.5YR 5/8) and few fine faint gray (10YR 6/1) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; very friable; few fine roots; strongly acid; abrupt smooth boundary.

BCg—37 to 47 inches; gray (10YR 5/1) loamy sand; few fine distinct strong brown (7.5YR 5/8) and many medium distinct dark brown (10YR 4/3) mottles; weak medium subangular blocky structure; very friable; few fine roots; few thin dark gray (10YR 4/1) clay films on faces of peds; strongly acid; clear smooth boundary.

Cg—47 to 65 inches; dark grayish brown (10YR 4/2) sand; few fine faint dark yellowish brown (10YR 4/6) mottles; single grain; loose; medium acid.

The thickness of the solum ranges from 40 to 60 inches. The dark surface layer is 8 to 11 inches thick. In pedons where the dark surface layer is less than 10 inches thick, an albic horizon separates the horizons that together meet all of the requirements for a mollic epipedon.

The Ap horizon is sandy loam to silt loam. The albic horizon is 9 to 14 inches thick. It is loam to loamy sand. It has value of 4 to 6 and chroma of 1 or 2. The Bt horizon is loam, sandy clay loam, or clay loam. The BC horizon is sandy loam to sand. The C horizon is stratified sand and loamy sand and in some pedons is stratified with heavier textures.

Otter Series

The Otter series consists of deep, poorly drained, moderately permeable soils on flood plains. These soils formed in silty sediments. Slope ranges from 0 to 2 percent.

Otter soils are similar to Comfrey and Lawson soils and are commonly adjacent to Lawson soils. Comfrey soils contain more sand in the solum than the Otter soils. They are in positions on the landscape similar to those of the Otter soils. Lawson soils are somewhat poorly drained and are slightly higher on the landscape than the Otter soils.

Typical pedon of Otter silt loam, in a cultivated field; 644 feet north and 550 feet west of the southeast corner of sec. 29, T. 22 N., R. 8 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; few fine faint dark yellowish brown (10YR 4/4) mottles; moderate fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—10 to 30 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; few fine faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; few thin light gray (10YR 7/2) silt coatings in the lower part; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Cg—30 to 35 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; dark grayish brown (10YR 4/2) strata; few fine faint dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine dark concretions (iron and manganese oxides); few thin very dark gray (10YR 3/4) organic coatings on faces of peds; neutral; clear smooth boundary.

Ab—35 to 60 inches; very dark gray (10YR 3/1) silt loam; few fine faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots; many thin dark grayish brown (10YR 4/2) coatings on faces of peds; common fine dark concretions (iron and manganese oxides); slightly acid.

The thickness of the mollic epipedon ranges from 25 to 42 inches. The A horizon has value of 2 or 3 and chroma of 0 to 2. It is slightly acid or neutral. The C

horizon has value of 2 to 5 and chroma of 1 or 2. It typically is silt loam, but subhorizons are loam or sandy loam in some pedons.

Palsgrove Series

The Palsgrove series consists of deep, well drained soils on uplands. These soils formed in loess and in the underlying material weathered from limestone bedrock. Permeability is moderate in the upper part of the solum and slow in the lower part. Slope ranges from 5 to 10 percent.

Palsgrove soils are similar to St. Charles soils and are commonly adjacent to St. Charles and Whalan soils. St. Charles soils do not have lithic contact within a depth of 60 inches. They contain more sand in the lower part of the solum than the Palsgrove soils. Also, they are commonly higher on the landscape. Whalan soils have lithic contact at a depth of 20 to 40 inches and contain more sand in the subsoil than the Palsgrove soils. They are in the more sloping areas.

Typical pedon of Palsgrove silt loam, 5 to 10 percent slopes, in a cultivated field; 100 feet west and 2,511 feet north of the southeast corner of sec. 29, T. 22 N., R. 9 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

Bt1—7 to 15 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and very fine subangular blocky structure; friable; common fine roots; common thin brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—15 to 24 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate fine subangular blocky and angular blocky structure; friable; common fine roots; many thin brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—24 to 31 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; common fine roots; many fine brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt4—31 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; friable; common fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; many thin light gray (10YR 7/2) silt coatings on faces of peds; medium acid; abrupt smooth boundary.

2Bt5—40 to 42 inches; brown (7.5YR 5/4) and reddish brown (5YR 4/4) sandy clay loam; moderate coarse prismatic structure; friable; common fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; medium acid; abrupt smooth boundary.

3Bt6—42 to 47 inches; red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm; few fine roots; many thin reddish brown (5YR 4/3) clay films on faces of peds; slightly acid; abrupt smooth boundary.

3R—47 inches; yellow (10YR 7/8) fractured limestone bedrock.

The thickness of the solum ranges from 40 to 60 inches and is the same as the depth to lithic contact. The A horizon ranges from 5 to 9 inches in thickness. Pedons in undisturbed areas have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. The 2B horizon has hue of 5YR, 2.5YR, 7.5YR, or 10YR, value of 4 or 5, and chroma of 3 to 6. Some pedons do not have the 3B horizon of residuum and have a thin layer of drift between the loess and bedrock.

Parr Series

The Parr series consists of deep, well drained, moderately permeable soils on till plains. These soils formed in a thin layer of loess and in the underlying calcareous, loamy till. Slope ranges from 2 to 10 percent.

Parr soils are similar to La Rose, Prairieville, and Saybrook soils and are commonly adjacent to La Rose, Odell, and Saybrook soils. La Rose soils are lower on the landscape than the Parr soils. Also, they have a thinner solum. Prairieville soils are moderately well drained. Their solum is thicker than that of the Parr soils. Saybrook soils are moderately well drained and formed in 10 to 40 inches of loess. Their positions on the landscape are similar to those of the Parr soils. Odell soils are somewhat poorly drained and are in the slightly lower landscape positions.

Typical pedon of Parr silt loam, 2 to 5 percent slopes, 696 feet north and 96 feet west of the southeast corner of sec. 32, T. 21 N., R. 10 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

AB—8 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure parting to moderate fine granular; friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—12 to 19 inches; dark brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

2Bt2—19 to 26 inches; brown (10YR 4/3) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin dark brown

(10YR 3/3) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt3—26 to 38 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin dark brown (10YR 3/3) clay films on faces of peds; few pebbles, 2 to 5 millimeters in diameter; many fine dark concretions (iron and manganese oxides); slightly acid; abrupt smooth boundary.

2C—38 to 60 inches; yellowish brown (10YR 5/4) loam; massive; friable; few fine roots; many pebbles 2 to 10 millimeters in diameter and few pebbles more than 10 millimeters in diameter; common fine dark concretions (iron and manganese oxides); strong effervescence; mildly alkaline.

The thickness of the solum ranges from 24 to 40 inches and commonly is the same as the depth to carbonates. The mollic epipedon is 10 to 14 inches thick.

The A horizon is typically silt loam, but the range includes loam and fine sandy loam. The B horizon has hue of 10YR or 7.5YR and value of 4 or 5. It is dominantly medium acid or slightly acid but in some pedons is neutral in the lower part. Some pedons have a loam 2BC horizon. The 2C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 or 4. It is mildly alkaline or moderately alkaline.

The eroded Parr soils have a thinner dark surface layer than is definitive for the Parr series. This difference, however, does not significantly affect the use or behavior of the soils.

Plano Series

The Plano series consists of deep, well drained and moderately well drained, moderately permeable soils on outwash plains. These soils formed in loess and in the underlying stratified outwash. Slope ranges from 0 to 10 percent.

Plano soils are similar to Catlin and Waupecan soils and are commonly adjacent to Catlin, Drummer, and Elburn soils. Catlin soils contain more clay and less sand in the 2B and 2C horizons than the Plano soils. Their positions on the landscape are similar to those of the Plano soils. Drummer soils are poorly drained and are in broad low areas and small depressions. Elburn soils are somewhat poorly drained and are in the slightly lower areas. Waupecan soils contain more gravel in the lower part of the solum and in the substratum than the Plano soils.

Typical pedon of Plano silt loam, 0 to 2 percent slopes, 2,538 feet west and 474 feet north of the southeast corner of sec. 6, T. 39 N., R. 1 E.

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

BA—10 to 16 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate very fine subangular blocky structure; friable; few fine roots; few thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

Bt1—16 to 23 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; many thin dark brown (10YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.

Bt2—23 to 30 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; neutral; clear smooth boundary.

Bt3—30 to 39 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt4—39 to 46 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak fine subangular blocky; friable; few fine roots; many thin light brownish gray (2.5Y 6/2) clay films on faces of peds; common fine red and dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

BC1—46 to 56 inches; dark yellowish brown (10YR 4/4) silt loam; few fine distinct light brownish gray (2.5Y 6/2), common fine faint dark brown (7.5YR 4/4), and few fine faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine dark concretions (iron and manganese oxides); slightly acid; abrupt smooth boundary.

2BC2—56 to 60 inches; yellowish brown (10YR 5/4) stratified silt loam, loam, and sandy loam; few fine faint yellowish brown (10YR 5/4) and common fine distinct light gray (2.5Y 7/2) mottles; weak medium subangular blocky structure; friable; common fine dark concretions (iron and manganese oxides); slightly acid.

The thickness of the solum ranges from 60 to 70 inches. The depth to free carbonates is typically more than 60 inches. The mollic epipedon is 10 to 13 inches thick.

The BA horizon has chroma of 4 or 5. It is silty clay loam or silt loam. The Bt horizon is medium acid to neutral. The 2BC horizon is slightly acid to mildly alkaline.

Plano silt loam, 5 to 10 percent slopes, eroded, has a thinner surface layer than is definitive for the Plano series. This difference, however, does not significantly affect the use or behavior of the soil.

Prairieville Series

The Prairieville series consists of deep, moderately well drained, moderately slowly permeable soils on till plains. These soils formed in a thin layer of silty and loamy eolian material and in the underlying clay loam paleosol, which formed in till. Slope ranges from 1 to 5 percent.

Prairieville soils are similar to Parr and Vanpetten soils and are commonly adjacent to Clyde, Nachusa, Parr, and Vanpetten soils. Clyde soils are poorly drained and are in drainageways. Nachusa soils are somewhat poorly drained and are on the slightly lower parts of the landscape. Parr soils are lower on the landscape than the Prairieville soils. Also, they have a thinner solum. Vanpetten soils have contrasting coarse textures in the lower part of the solum. Their positions on the landscape are similar to those of the Prairieville soils.

Typical pedon of Prairieville silt loam, 1 to 5 percent slopes, in a cultivated field; 1,855 feet north and 346 feet west of the southeast corner of sec. 5, T. 20 N., R. 10 E.

Ap—0 to 9 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

A—9 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; common fine roots; medium acid; clear smooth boundary.

BA—12 to 18 inches; dark brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; common fine roots; many thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; strongly acid; clear smooth boundary.

Bw—18 to 26 inches; brown (10YR 4/3) loam; moderate medium subangular blocky structure; friable; few fine roots; common thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few pebbles, 2 to 5 millimeters in diameter; strongly acid; clear smooth boundary.

2Bt1—26 to 31 inches; yellowish brown (10YR 5/6) clay loam; moderate medium subangular blocky structure; firm; few fine roots; common thin dark grayish brown (10YR 4/2) clay films on faces of peds; few pebbles 2 to 5 millimeters in diameter; one pebble 20 millimeters in diameter; strongly acid; clear smooth boundary.

2Bt2—31 to 41 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

2Bt3—41 to 57 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct strong brown (7.5YR 5/8) and few fine faint brownish yellow (10YR 6/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many moderately thick dark brown (10YR 4/3) clay films on faces of peds; few dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

2Bt4—57 to 60 inches; yellowish brown (10YR 5/4) clay loam; few fine distinct strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; firm; few fine roots; few dark grayish brown (10YR 4/2) root channel fillings; neutral.

The thickness of the solum ranges from 48 to more than 75 inches. The thickness of the eolian deposits ranges from 13 to 34 inches. The mollic epipedon is 10 to 15 inches thick.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It typically is silt loam but in some pedons is loam. The B horizon has value of 4 or 5 and chroma of 3 or 4. In some pedons it has subhorizons of clay loam or silty clay loam. It ranges from very strongly acid to neutral. The 2B horizon typically has hue of 10YR or 7.5YR, but it has subhorizons that range to 2.5Y or 5Y. It has value of 4 to 7 and chroma of 1 to 8. In some pedons it has subhorizons of loam or clay. In the upper part it is strongly acid to slightly acid, and in the lower part it is medium acid to neutral. Some pedons have a 2C horizon.

Rockton Series

The Rockton series consists of moderately deep, well drained, moderately permeable soils on uplands. These soils formed in loamy glacial drift and in the underlying clayey material weathered from limestone bedrock. Slope ranges from 2 to 10 percent.

Rockton soils are similar to Hitt soils and are commonly adjacent to Hitt, Jasper, and Sogn soils. Hitt soils have lithic contact at a depth of more than 40 inches. They are commonly upslope from the Rockton soils. Jasper soils do not have bedrock within a depth of 60 inches. They are upslope from the Rockton soils. Sogn soils have lithic contact within a depth of 20 inches. They are commonly downslope from the Rockton soils.

Typical pedon of Rockton silt loam, 2 to 5 percent slopes, 196 feet west and 540 feet south of the northeast corner of sec. 30, T. 20 N., R. 10 E.

Ap—0 to 10 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.
Bt1—10 to 17 inches; dark brown (10YR 4/3) clay loam; weak fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; many thin very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.
Bt2—17 to 22 inches; dark brown (10YR 4/3) clay loam; weak fine subangular blocky structure parting to moderate medium granular; friable; few fine roots; few thin very dark grayish brown (10YR 3/2) clay films on faces of peds; neutral; clear smooth boundary.
Bt3—22 to 26 inches; dark yellowish brown (10YR 4/4) clay loam; weak fine subangular blocky structure; friable; few fine roots; common thin dark brown (7.5YR 4/3) clay films on faces of peds; neutral; clear smooth boundary.
2Bt4—26 to 29 inches; dark yellowish brown (10YR 4/4) clay; weak medium subangular blocky structure; firm; few fine roots; many thin dark brown (7.5YR 4/3) clay films on faces of peds; neutral; abrupt smooth boundary.
2R—29 inches; yellowish brown (10YR 5/6) fractured limestone bedrock; strong effervescence.

The thickness of the solum and the depth to limestone bedrock range from 20 to 40 inches. The mollic epipedon is 10 to 13 inches thick.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is dominantly silt loam, but the range includes loam. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is dominantly clay loam, but it has subhorizons of loam or sandy clay loam in some pedons. It is typically neutral but ranges to medium acid in some subhorizons. The 2B horizon is clay or clay loam. Some pedons do not have residuum.

Rockton silt loam, 5 to 10 percent slopes, eroded, has a slightly thinner dark surface layer than is definitive for the Rockton series. This difference, however, does not significantly affect the use or behavior of the soil.

Rodman Series

The Rodman series consists of deep, excessively drained soils on eskers, kames, moraines, and terrace breaks. These soils formed in calcareous, stratified sand and gravel. Permeability is moderately rapid in the solum and very rapid in the substratum. Slope ranges from 12 to 20 percent.

Rodman soils are commonly adjacent to Jasper, Griswold, and Warsaw soils. The adjacent soils are higher on the landscape than the Rodman soils. Also, their solum is thicker and contains more clay and less sand.

Typical pedon of Rodman gravelly sandy loam, 12 to 20 percent slopes, about 4 miles northeast of Dixon; 880 feet north and 800 feet east of the center of sec. 25, T. 22 N., R. 9 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) gravelly sandy loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; very friable; many fine roots; mildly alkaline; clear smooth boundary.
Bw1—7 to 12 inches; dark brown (10YR 3/3) gravelly sandy loam; moderate fine subangular blocky structure; very friable; many fine roots; mildly alkaline; clear smooth boundary.
Bw2—12 to 15 inches; dark brown (10YR 3/3) gravelly sandy loam; weak fine subangular blocky structure; very friable; common fine roots; slight effervescence; mildly alkaline; abrupt smooth boundary.
C—15 to 60 inches; yellowish brown (10YR 5/4) stratified gravelly loamy sand and sand; single grain; loose; few fine roots; violent effervescence; mildly alkaline.

The solum is 9 to 15 inches thick. It is neutral or mildly alkaline. The content of gravel ranges from 20 to 40 percent in the solum.

The A horizon has value of 2 or 3 and chroma of 1 or 2. It is gravelly loam or gravelly sandy loam. The C horizon dominantly is stratified sand and gravelly loamy sand, but the range includes gravel.

Ross Series

The Ross series consists of deep, well drained, moderately permeable soils on flood plains and terraces. These soils formed in silty and loamy alluvial sediments. Slope ranges from 0 to 2 percent.

Ross soils are similar to Du Page soils and are commonly adjacent to Du Page, Lawson, and Millington soils. The moderately well drained Du Page soils are on the slightly lower parts of the landscape. They are calcareous throughout. The somewhat poorly drained Lawson soils are slightly lower on the landscape than the Ross soils. Also, they contain less sand in the 10- to 40-inch control section. The poorly drained Millington soils are in the lower areas that are frequently flooded. They are calcareous throughout.

Typical pedon of Ross silt loam, 1,760 feet north and 1,040 feet west of the southeast corner of sec. 11, T. 21 N., R. 8 E.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A1—10 to 16 inches; black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; moderate fine granular structure; friable; many fine roots; neutral; clear smooth boundary.
A2—16 to 23 inches; black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; moderate fine granular structure; friable; common fine roots; neutral; clear smooth boundary.
Bw1—23 to 30 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; common fine roots; neutral; clear smooth boundary
Bw2—30 to 37 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak medium subangular blocky structure; friable; few fine roots; few thin very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.
Bw3—37 to 43 inches; dark brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few fine roots; few thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; neutral; clear smooth boundary.
Bw4—43 to 55 inches; dark brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.
C—55 to 60 inches; dark yellowish brown (10YR 4/4) sandy loam; massive; very friable; few fine roots; neutral.

The thickness of the solum ranges from 45 to 55 inches. The thickness of the mollic epipedon ranges from 24 to 40 inches.

The A horizon has value of 2 or 3 and chroma of 1 to 3. It is dominantly silt loam, but the range includes loam and fine sandy loam. The part of the B horizon below the mollic epipedon has chroma of 3 or 4. This horizon is dominantly silt loam and loam but in some pedons has subhorizons of sandy loam. It is slightly acid to mildly alkaline. The C horizon has value of 4 to 6 and chroma of 2 to 4. It is sandy loam to silt loam. Some pedons have individual horizons in which the content of gravel is 20 percent or more.

Sable Series

The Sable series consists of deep, poorly drained, moderately permeable soils in drainageways and depressions on loess-covered till plains. These soils formed in loess. Slope ranges from 0 to 2 percent.

Sable soils are similar to Drummer and Muscatine soils and are commonly adjacent to Muscatine and Tama soils. Drummer soils contain more sand in the lower part of the B horizon and the C horizon than the Sable soils. The somewhat poorly drained Muscatine and moderately well drained Tama soils are in the higher landscape positions.

Typical pedon of Sable silty clay loam, 132 feet south and 2,106 feet east of the northwest corner of sec. 22, T. 2 N., R. 10 E.

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.
A—7 to 12 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; slightly acid; clear smooth boundary.
Bg1—12 to 16 inches; dark gray (10YR 4/1) silty clay loam; few fine faint grayish brown (10YR 5/2) and few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; many thick very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.
Bg2—16 to 21 inches; dark gray (10YR 4/1) silty clay loam; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; friable; common thin very dark gray (10YR 3/1) organic coatings on faces of peds; neutral; clear smooth boundary.
Btg1—21 to 33 inches; olive gray (5Y 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few thin dark gray (10YR 4/1) clay films on faces of peds; few fine concretions (iron and manganese oxides); dark krotovinas; neutral; clear smooth boundary.
Btg2—33 to 51 inches; olive gray (5Y 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few thin dark gray (10YR 4/1) clay films on faces of peds; few fine concretions (iron and manganese oxides); neutral; clear smooth boundary.
Cg—51 to 60 inches; olive gray (5Y 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few fine concretions (iron and manganese oxides); dark krotovinas between depths of 52 and 54 inches; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 45 to 55 inches. The mollic epipedon is 12 to 16 inches thick.

The A horizon has value of 2 or 3 and chroma of 0 or 1. The B horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 or 5. The C horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 or 5, and chroma of 1 or 2. It is neutral or mildly alkaline.

In areas of the overwash phase, recent deposition has buried the original A horizon with 12 to 19 inches of silt loam overwash.

Saybrook Series

The Saybrook series consists of deep, moderately well drained, moderately permeable soils on loess-covered till plains and moraines. These soils formed in loess and in the underlying loamy glacial till. Slope ranges from 2 to 10 percent.

The Saybrook soils in this county have a thinner dark surface layer than is definitive for the Saybrook series. This difference, however, does not significantly affect the use or behavior of the soils.

Saybrook soils are similar to Catlin and Parr soils and are commonly adjacent to Catlin, Drummer, Flanagan, and Parr soils. Catlin soils are higher on the landscape than the Saybrook soils. Also, they formed in a thicker layer of loess. The poorly drained Drummer soils are in drainageways and depressions below the Saybrook soils. The somewhat poorly drained Flanagan soils are on the lower parts of the landscape. The well drained Parr soils are in positions on the landscape similar to those of the Saybrook soils. They are fine-loamy.

Typical pedon of Saybrook silt loam, 2 to 5 percent slopes, eroded, 98 feet west and 1,245 feet south of the northeast corner of sec. 36, T. 38 N., R. 2 E.

Ap—0 to 8 inches; mixed very dark gray (10YR 3/1) and dark yellowish brown (10YR 4/4) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; compacted; medium acid; abrupt smooth boundary.

Bt1—8 to 20 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; few thin very dark gray (10YR 3/1) organic coatings on faces of peds; many thin dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—20 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine prominent strong brown (7.5YR 5/8) and grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

2Bt3—29 to 33 inches; dark yellowish brown (10YR 4/4) clay loam; common fine prominent strong brown (7.5YR 5/8) and grayish brown (10YR 5/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine roots; many thin dark grayish brown (10YR 4/2) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); neutral; abrupt smooth boundary.

2BC—33 to 42 inches; brown (10YR 5/3) loam; few fine prominent light gray (10YR 7/1) and common fine prominent dark yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; friable; strong effervescence; mildly alkaline; clear smooth boundary.

2C—42 to 60 inches; brown (10YR 5/3) loam; few fine faint yellowish brown (10YR 5/8) mottles; massive; friable; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 36 to 42 inches. The dark surface layer is 6 to 9 inches thick.

Some pedons have a BA horizon. The B horizon has value of 4 or 5. The 2Bt horizon has hue of 10YR or 7.5YR. It is neutral or mildly alkaline. The 2BC horizon also is neutral or mildly alkaline. It has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 or 4. The 2C horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 3 or 4.

Selma Series

The Selma series consists of deep, poorly drained soils on outwash plains and lake plains that are subject to flooding. These soils formed in loamy material and in the underlying stratified, coarse textured outwash. Permeability is moderate in the solum and moderately rapid in the substratum. Slope ranges from 0 to 2 percent.

Selma soils are similar to Drummer soils and are commonly adjacent to Canisteo, Gilford, and Milford soils. Drummer soils are fine-silty. Canisteo soils are calcareous throughout. Gilford soils contain less clay and more sand than the Selma soils. Canisteo and Gilford soils are in positions on the landscape similar to those of the Selma soils. Milford soils contain more clay than the Selma soils. They are in the slightly lower or depressional areas.

Typical pedon of Selma loam, 2,511 feet south and 150 feet west of the northeast corner of sec. 3, T. 20 N., R. 8 E.

Ap—0 to 7 inches; black (N 2/0) loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; friable; few fine roots; few pebbles, 2 to 5 millimeters in diameter; neutral; abrupt smooth boundary.

A—7 to 12 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate fine granular structure; friable; few fine roots; few pebbles, 2 to 5 millimeters in diameter; neutral; clear smooth boundary.

AB—12 to 18 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure parting to moderate fine granular; friable; few fine roots; few pebbles, 2 to 5 millimeters in diameter; spots of dark gray (10YR

4/1) material from animal activity; neutral; clear smooth boundary.

Bg1—18 to 28 inches; dark gray (5Y 4/1) loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; few pebbles, 2 to 5 millimeters in diameter; neutral; clear smooth boundary.

Bg2—28 to 35 inches; olive gray (5Y 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; few thin very dark gray (10YR 3/1) organic coatings on faces of peds; few pebbles, 2 to 5 millimeters in diameter; krotovinas between depths of 33 and 35 inches; neutral; clear smooth boundary.

Bg3—35 to 41 inches; olive gray (5Y 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; neutral; clear smooth boundary.

BCg—41 to 53 inches; olive gray (5Y 5/2) sandy loam; weak medium prismatic structure; very friable; few fine roots; few pebbles, 2 to 20 millimeters in diameter; krotovinas between depths of 43 and 44 inches; mildly alkaline; clear smooth boundary.

Cg—53 to 60 inches; olive gray (5Y 5/2) stratified sandy loam and loamy sand; few fine distinct yellowish brown (10YR 5/6) mottles; single grain; very friable; few pebbles, 2 to 20 millimeters in diameter; krotovinas between depths of 54 and 56 inches; slight effervescence; mildly alkaline.

The thickness of the solum ranges from 38 to 55 inches. The mollic epipedon is 11 to 20 inches thick.

The A and AB horizons have value of 2 or 3. They typically are loam and less commonly are clay loam or silty clay loam. The B horizon typically has hue of 5Y or 2.5Y and chroma of 1 or 2. In some pedons it has subhorizons with hue of 10YR. In some pedons it is dominantly clay loam and has subhorizons of silty clay loam. In some pedons the lower part of the B horizon is sandy loam or sandy clay loam. In some pedons it is mildly alkaline or moderately alkaline. The C horizon has hue of 10YR, 2.5Y, or 5Y and chroma of 2 or 3. It is neutral to moderately alkaline. It is typically stratified sand, loamy sand, or sandy loam but in some pedons is stratified loam or silt loam. In some pedons the content of gravel is as much as 10 percent in this horizon.

Limestone bedrock is at a depth of 40 to 60 inches in areas of the bedrock substratum phase.

Sogn Series

The Sogn series consists of shallow, somewhat excessively drained, moderately permeable soils on side slopes along the major upland drainageways. These soils formed in a thin layer of loamy material and in material weathered from limestone bedrock. Slope ranges from 7 to 35 percent.

The Sogn soils in this county formed under a more humid climate and are steeper than is definitive for the Sogn series. These differences, however, do not significantly affect the use or behavior of the soils.

Sogn soils are commonly adjacent to Rockton and Whalan soils. The adjacent soils are commonly in upslope areas and are well drained. They have bedrock at a depth of 20 to 40 inches. Also, Whalan soils do not have a mollic epipedon.

Typical pedon of Sogn loam, 7 to 15 percent slopes, 48 feet north and 1,120 feet east of the center of sec. 22, T. 22 N., R. 11 E.

A—0 to 12 inches; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

R—12 inches; fractured limestone bedrock.

The thickness of the solum, the thickness of the mollic epipedon, and the depth to bedrock range from 4 to 20 inches. The A horizon has chroma of 1 or 2. It is commonly neutral or mildly alkaline. Some pedons have free carbonates above the bedrock.

Sparta Series

The Sparta series consists of deep, excessively drained, rapidly permeable soils on dunes. These soils formed in sandy material that was reworked by the wind. Slope ranges from 1 to 20 percent.

The Sparta soils in this county have a thinner dark surface layer than is definitive for the Sparta series. This difference, however, does not significantly affect the use or behavior of the soils.

Sparta soils are similar to Chelsea soils and are commonly adjacent to Chelsea, Dickinson, Gilford, Hoopeston, and Orio soils. All of the adjacent soils contain more clay in the control section than the Sparta soils. Chelsea and Dickinson soils are in positions on the landscape similar to those of the Sparta soils. Chelsea soils do not have a mollic epipedon. Gilford soils are poorly drained, are subject to flooding, are nearly level, and are on the lower parts of the landscape. Hoopeston soils are somewhat poorly drained and are in the lower landscape positions. Orio soils have an E horizon. They are in depressions.

Typical pedon of Sparta loamy sand, 1 to 7 percent slopes, eroded, 171 feet north and 766 feet west of the center of sec. 19, T. 20 N., R. 10 E.

Ap—0 to 8 inches; mixed very dark grayish brown (10YR 3/2) and dark yellowish brown (10YR 4/4) loamy sand, grayish brown (10YR 5/2) dry; weak fine

subangular blocky structure; very friable; few fine roots; neutral; abrupt smooth boundary.

Bw1—8 to 14 inches; dark yellowish brown (10YR 4/4) loamy sand; weak medium subangular blocky structure; very friable; few fine roots; medium acid; clear smooth boundary.

Bw2—14 to 34 inches; dark yellowish brown (10YR 4/6) sand; weak medium subangular blocky structure; very friable; few fine roots; strongly acid; clear smooth boundary.

C—34 to 60 inches; yellowish brown (10YR 5/6) sand; single grain; loose; strongly acid.

The thickness of the solum ranges from 28 to 40 inches. The dark surface layer is 6 to 14 inches thick. The B and C horizons are medium acid or strongly acid.

The A horizon is typically loamy sand, but in some pedons it is sand. The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The C horizon has hue of 10YR or 7.5YR.

St. Charles Series

The St. Charles series consists of deep, well drained, moderately permeable soils on outwash plains and stream terraces underlain by bedrock. These soils formed in 40 to 60 inches of loess and in the underlying stratified sediments. Slope ranges from 0 to 5 percent.

St. Charles soils are similar to Birkbeck, Martinsville, and Plano soils and are commonly adjacent to Martinsville, Palsgrove, Plano, and Whalan soils. Birkbeck soils are in positions on the landscape similar to those of the St. Charles soils. They are firm in the lower part of the solum. The well drained Martinsville soils contain more sand in the solum than the St. Charles soils. Their positions on the landscape are similar to those of the St. Charles soils. Palsgrove soils are on slopes above the terraces. They have bedrock within a depth of 60 inches. Plano soils have a mollic epipedon. Their positions on the landscape are similar to those of the St. Charles soils. Whalan soils are on the steeper slopes below the terraces. They have bedrock within a depth of 40 inches.

Typical pedon of St. Charles silt loam, 2 to 5 percent slopes, 2,320 feet south and 1,540 feet east of the northwest corner of sec. 28, T. 22 N., R. 9 E.

Ap—0 to 8 inches; mixed dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/6) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

Bt1—8 to 15 inches; yellowish brown (10YR 5/4) silt loam; moderate fine subangular blocky structure; friable; common fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Bt2—15 to 25 inches; yellowish brown (10YR 5/4) silty clay loam; weak medium prismatic structure parting to moderate fine subangular blocky; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); neutral; clear smooth boundary.

Bt3—25 to 33 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few thin light gray (10YR 7/2) silt coatings on faces of peds when dry; few fine dark accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt4—33 to 41 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct light brownish gray (10YR 6/2) and few fine faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; many thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few thin light gray (10YR 7/2) silt coatings on faces of peds when dry; few fine dark accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

2Bt5—41 to 58 inches; yellowish brown (10YR 5/4) stratified silt loam, loam, and sandy loam; common fine distinct strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure; friable; few fine roots; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); slightly acid; clear smooth boundary.

2Bt6—58 to 65 inches; yellowish brown (10YR 5/6) stratified loam and sandy loam; common fine distinct strong brown (7.5YR 5/6) and brown (10YR 5/3) mottles; weak medium prismatic structure; friable; few fine roots; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine dark accumulations (iron and manganese oxides); slightly acid.

The solum ranges from 55 to 70 inches in thickness. It is medium acid to neutral. The A horizon is 6 to 10 inches thick. The depth to stratified material ranges from 41 to 55 inches.

The Ap horizon has value of 3 or 4. Pedons in uncultivated areas have an E horizon. The Bt horizon has value of 4 or 5 and chroma of 4 to 6.

Tama Series

The Tama series consists of deep, moderately well drained, moderately permeable soils on loess-covered

uplands. These soils formed in loess. Slope ranges from 0 to 10 percent.

Tama soils are similar to Catlin, Downs, and Plano soils and are commonly adjacent to Catlin, Downs, Muscatine, and Sable soils. Catlin and Downs soils are in positions on the landscape similar to those of the Tama soils. Catlin soils are underlain by loam glacial till. The dark surface layer of the Downs soils is thinner than that of the Tama soils. Muscatine soils are somewhat poorly drained and are on the slightly lower parts of the landscape. Plano soils are stratified in the lower part of the subsoil. Their positions on the landscape are similar to those of the Tama soils. Sable soils are poorly drained and are in the less sloping areas.

Typical pedon of Tama silt loam, 2 to 5 percent slopes, 860 feet south and 432 feet east of the northwest corner of sec. 21, T. 21 N., R. 10 E.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine and fine granular structure; friable; slightly acid; abrupt smooth boundary.

A—8 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—13 to 18 inches; dark brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin very dark gray (10YR 3/1) coatings on faces of peds; medium acid; clear smooth boundary.

Bt2—18 to 26 inches; dark brown (10YR 4/3) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few thin very dark gray (10YR 3/1) coatings on faces of peds; medium acid; clear smooth boundary.

Bt3—26 to 39 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on faces of peds; few dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt4—39 to 51 inches; dark yellowish brown (10YR 4/4) silty clay loam; few medium distinct grayish brown (10YR 5/2) and few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; very few thin dark grayish brown (10YR 4/2) clay films on faces of peds; few dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

C—51 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct light brownish gray (10YR 6/2) and common medium distinct yellowish brown (10YR 5/6) mottles; massive; friable; few carbonate accumulations; mildly alkaline; strong effervescence.

The thickness of the solum ranges from 42 to more than 60 inches. The mollic epipedon is 10 to 14 inches thick.

The B horizon has value of 4 or 5 and chroma of 3 or 4. The C horizon has value of 4 or 5 and chroma of 4 to 6. It is slightly acid to mildly alkaline.

Tama silt loam, 5 to 10 percent slopes, eroded, has a thinner dark surface layer than is definitive for the Tama series. This difference, however, does not significantly affect the use or behavior of the soil.

Thorp Variant

The Thorp Variant consists of deep, poorly drained, slowly permeable soils in depressions on uplands. These soils formed in loamy material and in the underlying glacial till, which has a paleosol. Slope ranges from 0 to 2 percent.

Thorp Variant soils are similar to Orio soils and are commonly adjacent to Binghampton, Clyde, Dakota, and Nachusa soils. The adjacent soils do not have an albic horizon and do not have an abrupt textural change in the upper part of the B horizon. The somewhat poorly drained Binghampton soils are in the slightly higher landscape positions. They have contrasting textures in the upper part of the solum. Their dark surface layer is thinner than that of the Thorp Variant soils. Clyde soils are in the slightly higher landscape positions. The well drained Dakota soils are on dunelike ridges. They have contrasting textures in the upper part of the solum and are underlain by sandy material. The somewhat poorly drained Nachusa soils are in the slightly higher landscape positions. Orio soils are underlain by sandy outwash. They are in depressions on outwash plains.

Typical pedon of Thorp Variant, silt loam, 350 feet south and 1,728 feet east of the northwest corner of sec. 11, T. 20 N., R. 8 E.

Ap—0 to 8 inches; black (10YR 2/1) silt loam; moderate fine granular structure; friable; strongly acid; abrupt smooth boundary.

A—8 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; very strongly acid; clear smooth boundary.

E—10 to 16 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/1) dry; moderate medium platy structure; friable; very strongly acid; abrupt smooth boundary.

Btg1—16 to 24 inches; dark gray (5Y 4/1) clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; strong medium angular blocky structure; firm; many thick very dark gray (10YR 3/1) clay films on faces of peds; many fine roots; strongly acid; gradual smooth boundary.

Btg2—24 to 31 inches; dark gray (5Y 4/1) loam; many fine prominent strong brown (7.5YR 5/6) mottles;

moderate coarse prismatic structure parting to strong medium angular blocky; many thick very dark gray (10YR 3/1) clay films on faces of peds; firm; strongly acid; abrupt smooth boundary.

Btg3—31 to 34 inches; dark gray (5Y 4/1) sandy loam; many medium prominent strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure; very friable; few moderately thick very dark gray (10YR 3/1) clay films on vertical faces of peds; medium acid; abrupt smooth boundary.

2Btg4—34 to 39 inches; gray (5Y 5/1) clay loam; many large prominent yellowish brown (10YR 5/6) mottles in the upper part becoming few and fine in the lower part; moderate coarse prismatic structure; friable; many moderately thick dark gray (10YR 4/1) clay films on vertical faces of peds; common moderately thick very dark gray (10YR 3/1) organic coatings on faces of peds; slightly acid; clear smooth boundary.

2Btg5—39 to 56 inches; gray (5Y 5/1) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure; friable; common moderately thick dark gray (10YR 4/1) clay films on faces of peds; slightly acid; clear smooth boundary.

2Btg6—56 to 60 inches; gray (5Y 5/1) clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; friable; slightly acid.

The thickness of the solum ranges from 5 to more than 7 feet. The mollic epipedon is 10 to 13 inches thick. The loamy material above the till is 20 to 40 inches thick.

The Ap and A horizons have value of 2 or 3 and chroma of 1 or 2. They are typically silt loam but in some pedons are loam. The E horizon has value of 4 or 5 and chroma of 1 or 2. It is silt loam or loam. The content of clay in this horizon averages less than 18 percent. The Bt horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 2 to 5 and chroma of 0 to 2. It is dominantly loam or clay loam but commonly has thin subhorizons of sandy loam, sandy clay loam, or loamy sand. It is strongly acid to neutral. The 2Bt horizon generally has hue of 10YR, 2.5Y, or 5Y, but in some pedons it has hue of 7.5YR in the lower part. It has value of 4 to 6 and chroma of 1 to 6. It is dominantly clay loam but in some pedons has thin subhorizons of clay. It is medium acid to neutral in the upper part and slightly acid or neutral in the lower part.

Vanpetten Series

The Vanpetten series consists of deep, moderately well drained soils on till plains. These soils formed in loamy and sandy material and in the underlying paleosol, which formed in glacial till. Permeability is moderate in the loamy sediments, very rapid in the sandy sediments, and moderately slow in the paleosol. Slope ranges from 1 to 5 percent.

Vanpetten soils are similar to Binghampton and Prairieville soils and are commonly adjacent to Binghampton and Dakota soils. Binghampton soils are somewhat poorly drained and are on the slightly lower parts of the landscape. Their dark surface layer is thinner than that of the Vanpetten soils. Dakota soils are well drained and are on the slightly higher dunal ridges. They do not have loamy material in the lower part of the solum. Prairieville soils have an argillic horizon and do not have contrasting textures within a depth of 40 inches.

Typical pedon of Vanpetten loam, 1 to 5 percent slopes, in a cultivated field; 287 feet north and 2,538 feet west of the southeast corner of sec. 19, T. 21 N., R. 9 E.

Ap—0 to 6 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; friable; many fine roots; neutral; abrupt smooth boundary.

A—6 to 12 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

Bw1—12 to 16 inches; dark brown (10YR 4/3) silt loam; moderate fine subangular blocky structure; friable; many fine roots; many thin dark brown (10YR 3/3) organic coatings on faces of peds; medium acid; clear smooth boundary.

Bw2—16 to 24 inches; dark brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; common fine roots; few thin dark brown (10YR 3/3) organic coatings on faces of peds; very strongly acid; clear smooth boundary.

Bw3—24 to 28 inches; dark brown (10YR 4/3) sandy loam; moderate medium subangular blocky structure; friable; common fine roots; few thin dark brown (10YR 3/3) organic coatings on faces of peds; medium acid; clear smooth boundary.

2Bw4—28 to 37 inches; yellowish brown (10YR 5/4) coarse sand; weak medium subangular blocky structure; very friable; few fine roots; medium acid; clear smooth boundary.

2Bt—37 to 50 inches; dark yellowish brown (10YR 4/6) loamy coarse sand; common fine distinct strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; very friable; few fine roots; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; abrupt smooth boundary.

3Btg—50 to 66 inches; gray (5Y 5/1) clay loam; common fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure; friable; few fine roots; few thin dark grayish brown (10YR 4/2) clay films on vertical faces of peds; medium acid.

The thickness of the solum ranges from 55 to 70 inches. The thickness of the loamy eolian deposits ranges from 18 to 35 inches. The thickness of the water-sorted sandy sediments ranges from 12 to 36 inches.

The thickness of the Ap horizon combined with that of the A horizon is 10 to 15 inches. These horizons have value of 2 or 3. They are loam or silt loam. The B horizon has value of 4 or 5 and chroma of 3 or 4. It is dominantly silt loam in the upper part but in some pedons is loam. It is very strongly acid to medium acid. The 2Bw and 2Bt horizons have hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 1 to 8. In some pedons they have thin subhorizons of loam. They are extremely acid to slightly acid. The 3Btg or 3Bt horizon has hue of 5Y, 2.5Y, 10YR, or 7.5YR, value of 3 to 7, and chroma of 1 to 8. It is commonly clay loam, but the range includes silt loam, loam, and silty clay loam. This horizon is very strongly acid to neutral.

Warsaw Series

The Warsaw series consists of deep, well drained soils on outwash plains and terraces. These soils formed in loamy material and in the underlying stratified, calcareous sand and gravel. Permeability is moderate in the subsoil and very rapid in the substratum. Slope ranges from 0 to 10 percent.

Warsaw soils are similar to Dakota and Waukee soils and are commonly adjacent to Dickinson, Elburn, Plano, and Sparta soils. Dakota soils contain less gravel in the lower part of the solum and the substratum than the Warsaw soils. The somewhat excessively drained Dickinson and excessively drained Sparta soils are on dunes and are higher on the landscape than the Warsaw soils. Dickinson soils have a sandy loam B horizon. Sparta soils have a sandy solum. The somewhat poorly drained Elburn and moderately well drained Plano soils are higher on the landscape than the Warsaw soils. Also, they contain less sand in the control section and have medium textured outwash below a depth of 40 inches. Waukee soils do not have an argillic horizon.

Typical pedon of Warsaw loam, 0 to 2 percent slopes, 1,190 feet west and 1,400 feet north of the southeast corner of sec. 24, T. 20 N., R. 10 E.

Ap—0 to 11 inches; black (10YR 2/1) loam, grayish brown (10YR 5/2) dry moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Bt1—11 to 16 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; many thin very dark gray (10YR 3/1) organic coatings on faces of peds; 2 to 5 percent gravel; slightly acid; clear smooth boundary.

2Bt2—16 to 23 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; common thin dark yellowish brown (10YR 3/4) clay films on faces of peds; 5 to 8 percent gravel; slightly acid; clear smooth boundary.

2Bt3—23 to 28 inches; dark brown (7.5YR 4/4) gravelly sandy loam; weak medium subangular blocky structure; very friable; few fine roots; few thin very dark gray (10YR 3/1) organic coatings and clay films in linings of voids and on pebble faces; about 20 percent gravel; neutral; abrupt smooth boundary.

2C—28 to 60 inches; yellowish brown (10YR 5/4) sand and gravel; single grain; loose; few fine roots; 30 to 40 percent gravel; strong effervescence; mildly alkaline.

The thickness of the solum, the depth to free carbonates, and the depth to sand and gravel are 28 to 30 inches. The mollic epipedon is 11 to 13 inches thick.

The Ap horizon is loam or silt loam. The Bt horizon has value of 4 or 5 and chroma of 4 to 6. It is clay loam or loam. The content of gravel in this horizon ranges from 0 to 8 percent.

Warsaw silt loam, 2 to 5 percent slopes, eroded, and Warsaw loam, 5 to 10 percent slopes, eroded, have a slightly thinner dark surface layer than is definitive for the Warsaw series. This difference, however, does not significantly affect the use or behavior of the soils.

Waukee Series

The Waukee series consists of deep, well drained soils on terraces and outwash plains. These soils formed in loamy or silty sediments and in the underlying sandy outwash. Permeability is moderate in the loamy or silty sediments and very rapid in the underlying sandy material. Slope ranges from 0 to 3 percent.

Waukee soils are similar to Dakota and Warsaw soils and are commonly adjacent to Dakota, La Hogue, and Selma soils. Dakota soils have an argillic horizon. They are on the slightly higher dune-shaped ridges. La Hogue and Selma soils do not have contrasting textures. The somewhat poorly drained La Hogue soils are on the slightly lower parts of the landscape. The poorly drained Selma soils are in the broad lower areas. Warsaw soils have an argillic horizon.

Typical pedon of Waukee silt loam, 0 to 3 percent slopes, 840 feet south and 368 feet east of the center of sec. 29, T. 21 N., R. 8 E.

Ap—0 to 7 inches; very dark gray (10YR 3/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; medium acid; abrupt smooth boundary.

A—7 to 11 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; medium acid; clear smooth boundary.

Bw1—11 to 18 inches; dark yellowish brown (10YR 3/4) silt loam; moderate medium subangular blocky structure; friable; strongly acid; clear smooth boundary.
Bw2—18 to 26 inches; dark yellowish brown (10YR 4/6) silt loam; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few thin dark brown (10YR 3/3) organic coatings on faces of peds; few fine concretions (iron and manganese oxides); strongly acid; abrupt smooth boundary.
Bw3—26 to 32 inches; dark yellowish brown (10YR 4/6) sandy clay loam; moderate medium subangular blocky structure; friable; few thin dark brown (10YR 3/3) organic coatings on faces of peds; many pebbles, 2 to 5 millimeters in diameter; strongly acid; clear smooth boundary.
2BC—32 to 37 inches; dark yellowish brown (10YR 4/6) loamy sand; weak medium subangular blocky structure; friable; strongly acid; clear smooth boundary.
2C1—37 to 52 inches; dark yellowish brown (10YR 4/4) sand; single grain; loose; many small pebbles, 2 to 5 millimeters in diameter; medium acid; abrupt smooth boundary.
2C2—52 to 60 inches; yellowish brown (10YR 5/4) sand; single grain; loose; medium acid.

The thickness of the solum ranges from 36 to 48 inches. The mollic epipedon is 10 to 16 inches thick. The loamy material above the sand ranges from 30 to 40 inches in thickness.

The A horizon is loam or silt loam. The B horizon has chroma of 3 to 6. In some pedons it has hue of 7.5YR in one or more subhorizons. In the upper part it is silt loam high in content of sand or is loam. It commonly grades to sandy clay loam or sandy loam in the lower part. It is medium acid or strongly acid. The 2BC horizon has hue of 10YR or 7.5YR and chroma of 4 to 6. It is strongly acid to neutral. The 2C horizon is medium acid to neutral. It has hue of 7.5YR or 10YR. In some pedons it has subhorizons in which the content of gravel, by volume, is 20 to 50 percent.

Waupecan Series

The Waupecan series consists of deep, moderately well drained soils on outwash plains. These soils formed in loess and in the underlying stratified outwash. Permeability is moderate in the upper part of the profile and very rapid in the substratum. Slope ranges from 0 to 5 percent.

Waupecan soils are similar to Plano soils and are commonly adjacent to the Drummer and Elburn soils that have a gravelly substratum. Plano soils do not contain gravel in the lower part of the solum or in the 2C horizon. Drummer soils are poorly drained and are in the broad low landscape positions. Elburn soils are somewhat poorly drained and are on the slightly lower parts of the landscape.

Typical pedon of Waupecan silt loam, 0 to 2 percent slopes, 1,100 feet south and 1,640 feet west of the northeast corner of sec. 18, T. 39 N., R. 2 E.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few thin light gray (10YR 7/2) silt coatings on faces of peds; neutral; clear smooth boundary.
AB—7 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to moderate fine granular; friable; few thin very dark gray (10YR 3/1) organic coatings on faces of peds; few thin light gray (10YR 7/2) silt coatings on faces of peds; neutral; clear smooth boundary.
Bt1—12 to 19 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; few thin very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few thin light gray (10YR 7/2) silt coatings on faces of peds; medium acid; clear smooth boundary.
Bt2—19 to 24 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; friable; common thin dark yellowish brown (10YR 4/4) clay films on faces of peds; few thin light gray (10YR 7/2) silt coatings on faces of peds; medium acid; clear smooth boundary.
Bt3—24 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine faint brown (10YR 5/3) and common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few thin dark brown (10YR 4/3) clay films on faces of peds; medium acid; clear smooth boundary.
Bt4—30 to 35 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint grayish brown (10YR 5/2) and few fine prominent yellowish red (5YR 4/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; common thin dark brown (10YR 3/3) clay films on faces of peds; medium acid; clear smooth boundary.
2Bt5—35 to 40 inches; dark yellowish brown (10YR 4/4) clay loam; common fine distinct light brownish gray (10YR 6/2) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable; common thin dark brown (10YR 4/3) clay films on faces of peds; common thin light gray (10YR 7/2) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); several pebbles, 1 to 5 millimeters in diameter; medium acid; clear smooth boundary.
2Bt6—40 to 44 inches; dark yellowish brown (10YR 4/4) clay loam; few fine distinct strong brown (7.5YR 5/6)

mottles; weak medium subangular blocky structure; friable; common thin dark brown (7.5YR 4/4) clay films on faces of peds; several pebbles, 1 to 10 millimeters in diameter; medium acid; abrupt smooth boundary.

2Bw—44 to 47 inches; dark brown (7.5YR 3/2) gravelly clay loam; weak medium subangular blocky structure; friable; many small pebbles, 1 to 10 millimeters in diameter; few fine dark concretions (iron and manganese oxides); medium acid; abrupt smooth boundary.

2C—47 to 60 inches; brown (10YR 5/3) sand and gravel; single grain; loose; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 45 to 60 inches. The mollic epipedon is 10 to 13 inches thick. The depth to the 2B horizon is 28 to 40 inches. Contrasting textures are below a depth of 40 inches.

The A horizon has chroma of 1 or 2. Some pedons have a BA horizon. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It is medium acid or slightly acid. The 2B horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. It is dominantly loam, sandy loam, clay loam, or gravelly clay loam. In some pedons, however, it is loamy sand or gravelly sandy loam in the lower part. It is medium acid to neutral. The 2C horizon ranges from gravelly sandy loam to sand and gravel. It is mildly alkaline to slightly acid.

Waupecan silt loam, 2 to 5 percent slopes, eroded, has a slightly thinner dark surface layer than is definitive for the Waupecan series. This difference, however, does not significantly affect the use or behavior of the soil.

Whalan Series

The Whalan series consists of moderately deep, well drained soils along drainageways on uplands. These soils formed in 20 to 40 inches of loamy material and clayey limestone residuum. Permeability is moderate in the upper horizons and slow in the clayey horizon directly above the bedrock. Slope ranges from 2 to 35 percent.

Whalan soils are similar to Martinsville and Palsgrove soils and are commonly adjacent to Martinsville, Palsgrove, St. Charles, and Sogn soils. Martinsville, Palsgrove, and St. Charles soils are in the less sloping areas above the Whalan soils. Martinsville and St. Charles soils do not have bedrock within 60 inches of the surface. Palsgrove soils have bedrock at a depth of 40 to 60 inches. Sogn soils are in positions on the landscape similar to those of the Whalan soils. They have bedrock within 20 inches of the surface.

Typical pedon of Whalan loam, 7 to 15 percent slopes; 180 feet east and 650 feet north of the center of sec. 17, T. 22 N., R. 10 E.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; few fine roots; neutral; clear smooth boundary.

E—4 to 7 inches; dark yellowish brown (10YR 4/4) and very dark grayish brown (10YR 3/2) loam; weak medium platy structure; friable; few fine roots; neutral; clear smooth boundary.

Bt1—7 to 16 inches; dark brown (7.5YR 4/4) clay loam; moderate medium subangular blocky structure; firm; few fine roots; many thin dark reddish brown (5YR 3/4) clay films on faces of peds; slightly acid; clear smooth boundary.

2Bt2—16 to 23 inches; strong brown (7.5YR 4/6) clay; moderate medium subangular blocky structure; firm; few fine roots; many thin dark reddish brown (5YR 3/4) clay films on faces of peds; slightly acid; abrupt smooth boundary.

2R—23 inches; fractured, level-bedded limestone bedrock.

The thickness of the solum and the depth to bedrock range from 20 to 40 inches. The A horizon is 3 to 7 inches thick. Pedons in plowed areas commonly do not have an E horizon. The B horizon is loam or clay loam. The 2B horizon is clay or clay loam. It has hue of 5YR to 10YR. The B and 2B horizons are slightly acid or neutral.

Will Series

The Will series consists of deep, poorly drained soils on outwash plains. These soils formed in loamy outwash over stratified, calcareous sand and gravel. Permeability is moderate in the subsoil and rapid in the substratum. Slope ranges from 0 to 2 percent.

Will soils are similar to the Drummer soils that have a gravelly substratum and are commonly adjacent to those soils and to Canisteo and Selma soils. Canisteo soils have free carbonates throughout the 10- to 20-inch zone. Drummer and Selma soils have sand and gravel below a depth of 40 inches. Drummer soils contain less sand in the upper part of the solum than the Will soils. They are in the slightly higher landscape positions. Canisteo and Selma soils are in positions in the landscape similar to those of the Will soils.

Typical pedon of Will loam, 2,490 feet south and 402 feet west of the northeast corner of sec. 24, T. 20 N., R. 10 E.

Ap—0 to 6 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—6 to 11 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; weak medium subangular blocky structure; friable; few fine roots; less than 5 percent pebbles; neutral; clear smooth boundary.

Bg1—11 to 19 inches; dark gray (10YR 4/1) loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; continuous thin very dark gray (10YR 3/1) organic coatings on faces of peds; less than 5 percent pebbles; neutral; clear smooth boundary.

Bg2—19 to 29 inches; dark gray (10YR 4/1) loam; many fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common thin very dark gray (10YR 3/1) organic coatings on faces of peds; less than 5 percent pebbles; neutral; abrupt smooth boundary.

2Cg—29 to 60 inches; gray (10YR 5/1) gravelly loamy sand; few fine distinct strong brown (7.5YR 5/6) mottles; massive; loose; strong effervescence; mildly alkaline.

The thickness of the solum ranges from 28 to 40 inches and commonly is the same as the depth to sand and gravel. The mollic epipedon is 10 to 16 inches thick.

The A horizon has chroma of 0 or 1. It is loam or silt loam. The Bg horizon has hue of 10YR or 5Y and chroma of 1 or 2. It is loam or clay loam. It is slightly acid or neutral.

Formation of the Soils

This section describes the effects of the five soil-forming factors on the formation of the soils in the county. The parent material section includes a brief description of the surficial geology of the county.

Factors of Soil Formation

Soil-forming processes act on deposited or accumulated geologic material. The characteristics of the soil at any given point are determined by the physical and mineralogical composition of the parent material, the climate under which the soil material has accumulated and existed since accumulation, the plant and animal life on and in the soil, the relief, and the length of time that the forces of soil formation have acted on the soil material (*4*). The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can be made regarding the effect of any one factor unless conditions are specified for the other four.

Climate and plant and animal life, chiefly plants, are active factors of soil formation. As they act on the parent material that has accumulated through the weathering of rocks and that may have been relocated by water, glaciers, or wind, they slowly change the material into a natural body that has genetically related horizons. The effects of climate and plant and animal life are conditioned by relief. The parent material affects the kind of soil profile that forms and, in extreme cases, determines it almost entirely. Finally, time is needed for changing the parent material into a soil. Some time is always needed for the differentiation of soil horizons. Usually, a long time is needed for the development of distinct horizons.

Parent Material

Dr. John P. Kempton, geologist, Illinois State Geologic Survey, helped prepare this section.

The nature and distribution of the surficial materials in Lee County provide a basis for understanding the soils. The soils in the county formed in loess, glacial till, outwash deposits, eolian deposits, lacustrine deposits, alluvium, organic material, and material weathered from limestone and sandstone.

Loess, or silty wind-deposited material, is the most extensive parent material in the county. It blankets many of the other parent materials. The major source of the loess was the Mississippi River Valley, about 30 miles west of Lee County. The loess is referred to as Peoria Loess west of the Green River, where it reaches a maximum thickness of about 16 feet and overlies Illinoian-age glacial till. It is called Richland Loess east of the Green River, where it thins out to 5 feet or less and overlies Wisconsinan-age till. The moderately well drained Tama and somewhat poorly drained Muscatine soils formed in more than 5 feet of loess.

Glacial till is unsorted, nonstratified, pulverized rock and other rock material consisting of clay, silt, sand, pebbles, and boulders transported and deposited by glacial ice. In Lee County it typically is clay loam, loam, or sandy loam and is calcareous.

A recent map of the Quanternary deposits of Illinois shows six tills at or near the surface in Lee County (*7*). Four of these tills occur in a predictable pattern throughout the survey area. A number of older tills are buried (*16*). The oldest of the tills at or near the surface is Sterling Till. It is within 5 feet of the surface on side slopes where the loess is thin. It is gray clay loam till, mainly in South Dixon and Palmyra Townships. The moderately well drained Assumption soils formed in 20 to 40 inches of loess and in a paleosol that formed in glacial till.

Lee Center Till covers some areas in the northern and west-central parts of the county. It is a yellowish brown loam till. The moderately well drained Prairieville and somewhat poorly drained Nachusa soils formed in a thin layer of silty and loamy eolian material and in a paleosol that formed in glacial till.

Argyle Till is on side slopes along Sugar and Franklin Creeks and their tributaries. It is a brownish yellow sandy loam till. The well drained Kidder soils formed in a thin layer of loess and in the underlying sandy loam glacial till. The well drained Griswold soils formed in sandy loam glacial till.

Tiskilwa Till is the thickest glacial till deposit in the county. It forms the prominent Bloomington Morainal System, which swings in an arcuate pattern from the northeastern corner of the county to the southwestern corner. It is a yellowish brown loam till and is commonly 100 to 150 feet thick beneath the higher parts of the moraine. The moderately well drained Saybrook and well drained Parr soils formed in a thin layer of loess and in the underlying loamy glacial till.

Outwash material is deposited by running water from melting glaciers. It consists of stratified layers of different particle sizes. The sorting of individual layers of material is related to stream velocity at the time of deposition. The coarser textured layers are related to high stream velocities, and the finer textured layers are related to low stream velocities. Outwash is extensive in the county. A large area of sand and gravel is in front of the Bloomington Moraine near Steward. The moderately well drained Waupecan soils formed in loess and the underlying stratified outwash. West of Amboy is an extensive area of loamy sediments underlain by sand and gravel. The very poorly drained Gilford and poorly drained Selma soils formed in the loamy glacial outwash.

Sand dunes formed when westerly winds reworked sandy outwash deposits after glacial melt water receded. These eolian deposits are most extensive in the southwestern part of the county. Most are on the outwash plain in the Green River Lowlands. Some are in the uplands east of the outwash plain. Also, numerous dunes are adjacent to the Rock River. The excessively drained Chelsea and Sparta soils formed in sandy material reworked by wind.

Lacustrine material was deposited by glacial melt water. After the coarser particles were deposited as outwash by moving water, the finer particles of silt and clay were deposited in lakes or other still water. The poorly drained Milford soils formed in clayey and silty lacustrine sediments.

Alluvial material was recently deposited by floodwater from streams. The velocity of the floodwater determines the texture of the material deposited. Alluvium along a sluggish stream, such as Sugar Creek, is finer textured than alluvium along a swift stream, such as Franklin Creek. The poorly drained Otter soils, which formed in alluvium along Sugar Creek, contain less sand than the poorly drained Comfrey soils, which formed in alluvium along Franklin Creek.

Organic material is made up of partially decomposed plant remains. When the glaciers receded, water was left standing in depressions on outwash plains and till plains. Water-tolerant plants eventually filled in these areas through the process of growth and decay, forming large areas of muck. The very poorly drained Adrian and Houghton soils formed in organic material.

Bedrock occurs mostly in the northern part of the county near Dixon and Ashton. It is mainly Ordovician in age and generally is Galena-Platteville dolomitic limestone and Glenwood and St. Peter sandstone (*15*). The well drained Whalan soils formed in 20 to 40 inches of loamy material and clayey limestone residuum. The somewhat excessively drained Eleva soils formed in 20 to 40 inches of material weathered from sandstone bedrock.

Climate

Lee County has a temperate, humid, continental climate. Because it is generally uniform throughout the county, climate has not caused any obvious differences among the soils within the county.

Climate affects soil formation through its effect on weathering, vegetation, and erosion. When water from rain and melting snow percolates through the soil, it causes physical and chemical changes. It carries clay from the surface soil to the subsoil. Most of the soils in the county have accumulated clay in the subsoil. The percolating water dissolves minerals and leaches them downward. Free calcium carbonate has been removed from the upper layers of many of the soils in the county. As a result of this leaching process, some soil horizons are slightly acid to very strongly acid.

Climate helps to determine the amount and type of plant and animal life. The climate in Lee County favors hardwood trees and prairie grasses.

Thunderstorms can be particularly damaging if the soils are exposed when they are farmed or used as construction sites. More soil may be lost through erosion and soil blowing each year than is formed by natural processess. For more information on climate, see the section "General Nature of the County."

Plant and Animal Life

Plants have been the principal organisms affecting the soils in Lee County. Bacteria, actinomycetes, fungi, algae, protozoa, earthworms, insects, crayfish, and large burrowing animals, however, have also affected soil formation.

The chief contribution of plant and animal life is the addition of organic matter and nitrogen to the soil. The amount and kind of organic material on and in the soil depends on the kind of plants that grew on the soil. The native vegetation in the county was dominantly prairie grasses and hardwood trees. Grasses have many fine fibrous roots that add large amounts of organic matter to the soil when they die and decay. Tama, Catlin, and other soils that formed under grasses have a thick, black or dark brown surface layer. In contrast, the soils that formed under deciduous trees have a thin, light colored surface layer because in general the only organic matter added to the surface layer is from leaf litter. Fayette and Birkbeck soils formed under trees.

Bacteria, fungi, and other micro-organisms help to break down the organic matter and thus provide nutrients for plants and other soil organisms. The stability of soil aggregates—structural units made up of sand, silt, and clay—is affected by microbial activity because cellular excretions from these organisms help to bind soil particles together. Stable aggregates help to maintain soil porosity and promote favorable soil, water, and air relationships. Earthworms, crayfish, insects, and

large burrowing animals tend to incorporate organic matter into the soil and to keep soils open and porous.

Relief

Relief or topography has a marked influence on the soils through its effect on natural drainage, erosion, plant cover, and soil temperature. In Lee County, the slopes range from 0 to more than 35 percent. Natural soil drainage ranges from excessively drained on sandy ridgetops to very poorly drained in depressions.

Relief influences the formation of soils by affecting runoff and drainage. Drainage in turn, through its effect on aeration of the soil, determines the color of the soil. Runoff is most rapid on the steeper slopes. It is slowest in low areas where the water is temporarily ponded. Water and air move freely through well drained soils but slowly through very poorly drained soils. In well aerated soils, the iron and aluminum compounds that give most soils their color are brightly colored and oxidized. In poorly aerated soils, the colors are dull gray and mottled. Ashdale soils are an example of well drained, well aerated soils. Sable soils are an example of poorly aerated, poorly drained soils.

Topography also affects erosion. The rate of erosion increases as the length and percent of slopes increase.

Time

Time, usually several thousand years, is needed for the agents of soil formation to form distinct horizons. Differences in the length of time that the parent materials have been in place are commonly reflected in the degree of profile development. Over a given period, however, some soils form rapidly while other form slowly. The length of time needed for the formation of a soil depends on the other factors of soil formation.

In general, the more rapidly permeable soils having easily weatherable minerals and a low content of calcium carbonate form more rapidly than slowly permeable soils having a high content of calcium carbonate. Soils form more rapidly under forest vegetation than under prairie vegetation because the water penetrating the surface is more acid under forest vegetation and is more effective in leaching soluble bases. Soil formation on strongly sloping topography is slower than in less sloping areas because less water infiltrates the soil and the resulting runoff increases natural erosion of the surface layer. A soil that forms on nearly level topography accumulates water from adjacent slopes. The accumulation of water results in more rapid leaching of the more soluble compounds and thus in more rapid soil formation.

The soils in Lee County generally have moderately expressed horizons, but they range from young to mature. Coarse textured soils, such as Oakville and Sparta, consist mostly of slowly weatherable quartz minerals, which do not readily form soil horizons even though they are readily leached of calcium carbonates and tend to become acid. These soils remain youthful over time. Soils that formed in recent alluvial sediments, such as Lawson and Otter, also remain youthful because of the frequently deposited alluvium. Soils intermediate in maturity, such as Fayette and Tama, are on relatively stable landscapes where deposition is negligible. These soils form horizons from permeable, medium textured loess over a relatively short period.

Denny soils are an example of mature soils that have distinct horizons. They have leached subsurface horizons and contain more clay in the subsoil than Tama soils. Even though they formed over the same period, in the same kind of parent material, and under similar vegetaion, they are more mature than Tama soils. They formed in depressions, which collect runoff from surrounding slopes. The infiltrating water leaches soluble minerals from the surface layer to the subsoil at an accelerated rate.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on the contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow.

Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grains are grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist, 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial melt water.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial melt water. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A

soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash, glacial. Stratified sand and gravel produced by glaciers and carried, sorted, and deposited by glacial melt water.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Paleosol. A buried soil or formerly buried soil, especially one that formed during an interglacial period and was covered by deposits of later glaciers.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from

about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate

types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded and 6 to 15 inches (15 to 38 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. Includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-78 at Dixon, Illinois]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	28.8	11.4	20.2	55	-19	0	1.46	0.64	2.16	4	8.7
February---	34.4	17.1	25.8	57	-13	0	1.28	.58	1.88	4	6.3
March------	45.2	26.5	35.9	75	1	17	2.53	1.36	3.55	6	6.8
April------	61.6	39.1	50.4	86	21	99	3.83	2.50	5.03	8	.9
May--------	73.1	49.3	61.2	92	31	362	3.75	2.06	5.23	7	.0
June-------	82.3	58.9	70.7	96	42	621	4.54	2.95	5.97	7	.0
July-------	85.5	63.0	74.2	98	48	750	3.89	2.00	5.53	7	.0
August-----	83.7	60.8	72.3	96	46	691	3.52	1.43	5.27	6	.0
September--	76.6	53.0	64.8	95	34	444	3.27	1.14	5.02	6	.0
October----	65.2	42.1	53.7	87	23	196	2.73	.63	4.38	6	.2
November---	48.2	30.0	39.1	73	5	14	2.07	1.13	2.89	5	2.1
December---	33.6	18.3	25.9	62	-13	0	1.95	.81	2.90	5	9.9
Yearly:											
Average--	59.9	39.1	49.5	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	-20	---	---	---	---	---	---
Total----	---	---	---	---	---	3,194	34.82	28.61	40.72	71	34.9

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-78 at Dixon, Illinois]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 16	April 27	May 9
2 years in 10 later than--	April 11	April 23	May 5
5 years in 10 later than--	April 3	April 15	April 26
First freezing temperature in fall:			
1 year in 10 earlier than--	October 21	October 10	September 29
2 years in 10 earlier than--	October 26	October 15	October 3
5 years in 10 earlier than--	November 4	October 25	October 12

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-78 at Dixon, Illinois]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	193	173	149
8 years in 10	200	179	155
5 years in 10	214	192	168
2 years in 10	228	205	181
1 year in 10	235	212	188

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
27B	Miami silt loam, 2 to 5 percent slopes	344	0.1
27C2	Miami silt loam, 5 to 10 percent slopes, eroded	2,216	0.5
27D3	Miami clay loam, 8 to 15 percent slopes, severely eroded	799	0.2
27E	Miami loam, 15 to 25 percent slopes	504	0.1
36A	Tama silt loam, 0 to 2 percent slopes	3,871	0.8
36B	Tama silt loam, 2 to 5 percent slopes	28,265	6.0
36C2	Tama silt loam, 5 to 10 percent slopes, eroded	3,972	0.8
41A	Muscatine silt loam, 0 to 3 percent slopes	18,909	4.0
45	Denny silt loam	403	0.1
60B2	La Rose loam, 2 to 5 percent slopes, eroded	772	0.2
60C2	La Rose loam, 5 to 10 percent slopes, eroded	3,467	0.7
64B	Parr fine sandy loam, 2 to 5 percent slopes	3,607	0.8
64C2	Parr fine sandy loam, 5 to 10 percent slopes, eroded	1,186	0.3
67	Harpster silty clay loam	3,371	0.7
68	Sable silty clay loam	12,288	2.6
68+	Sable silt loam, overwash	5,455	1.2
69	Milford silty clay loam	948	0.2
73	Ross silt loam	1,043	0.2
76	Otter silt loam	1,310	0.3
82	Millington silty clay loam	679	0.1
87A	Dickinson sandy loam, 0 to 3 percent slopes	2,398	0.5
87B	Dickinson sandy loam, 3 to 7 percent slopes	5,917	1.3
88B2	Sparta loamy sand, 1 to 7 percent slopes, eroded	6,933	1.5
88D2	Sparta loamy sand, 7 to 20 percent slopes, eroded	1,238	0.3
93E	Rodman gravelly sandy loam, 12 to 20 percent slopes	352	0.1
102	La Hogue loam	6,127	1.3
103	Houghton muck	380	0.1
125	Selma loam	22,354	4.8
145B2	Saybrook silt loam, 2 to 5 percent slopes, eroded	15,130	3.2
145C2	Saybrook silt loam, 5 to 10 percent slopes, eroded	1,871	0.4
152	Drummer silty clay loam	26,302	5.6
154A	Flanagan silt loam, 0 to 3 percent slopes	6,173	1.3
171B	Catlin silt loam, 1 to 5 percent slopes	32,310	6.9
171C2	Catlin silt loam, 5 to 10 percent slopes, eroded	2,874	0.6
172	Hoopeston fine sandy loam	5,267	1.1
198	Elburn silt loam	12,630	2.7
199A	Plano silt loam, 0 to 2 percent slopes	1,626	0.3
199B	Plano silt loam, 2 to 5 percent slopes	5,369	1.1
199C2	Plano silt loam, 5 to 10 percent slopes, eroded	503	0.1
200	Orio sandy loam	4,500	1.0
201	Gilford fine sandy loam	16,195	3.5
204B2	Ayr sandy loam, 1 to 7 percent slopes, eroded	3,813	0.8
221B	Parr silt loam, 2 to 5 percent slopes	6,524	1.4
221B2	Parr silt loam, 2 to 5 percent slopes, eroded	10,234	2.2
221C2	Parr silt loam, 5 to 10 percent slopes, eroded	7,330	1.6
233B	Birkbeck silt loam, 2 to 5 percent slopes	1,378	0.3
233C2	Birkbeck silt loam, 5 to 10 percent slopes, eroded	2,818	0.6
243A	St. Charles silt loam, 0 to 2 percent slopes	208	*
243B	St. Charles silt loam, 2 to 5 percent slopes	501	0.1
244	Hartsburg silty clay loam	4,115	0.9
259C2	Assumption silt loam, 4 to 12 percent slopes, eroded	423	0.1
280B	Fayette silt loam, 2 to 5 percent slopes	3,060	0.7
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded	1,499	0.3
280D	Fayette silt loam, 10 to 15 percent slopes	382	0.1
290A	Warsaw loam, 0 to 2 percent slopes	434	0.1
290B2	Warsaw silt loam, 2 to 5 percent slopes, eroded	1,046	0.2
290C2	Warsaw loam, 5 to 10 percent slopes, eroded	416	0.1
321	Du Page silt loam	334	0.1
329	Will loam	865	0.2
332A	Billett fine sandy loam, 0 to 3 percent slopes	553	0.1
332B	Billett fine sandy loam, 3 to 7 percent slopes	1,650	0.4
332C2	Billett fine sandy loam, 5 to 12 percent slopes, eroded	477	0.1
350	Drummer silty clay loam, gravelly substratum	8,752	1.9
351	Elburn silt loam, gravelly substratum	3,239	0.7
355A	Binghampton sandy loam, 0 to 3 percent slopes	7,915	1.7
357B	Vanpetten loam, 1 to 5 percent slopes	6,937	1.5
361D2	Kidder silt loam, 10 to 15 percent slopes, eroded	769	0.2
363C2	Griswold loam, 5 to 10 percent slopes, eroded	921	0.2
363D2	Griswold loam, 10 to 15 percent slopes, eroded	464	0.1
369A	Waupecan silt loam, 0 to 2 percent slopes	5,103	1.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
369B2	Waupecan silt loam, 2 to 5 percent slopes, eroded	491	0.1
379B2	Dakota sandy loam, 1 to 7 percent slopes, eroded	5,352	1.1
386B	Downs silt loam, 2 to 5 percent slopes	4,709	1.0
411B	Ashdale silt loam, 2 to 5 percent slopes	494	0.1
411C2	Ashdale silt loam, 5 to 10 percent slopes, eroded	308	0.1
429C	Palsgrove silt loam, 5 to 10 percent slopes	214	*
440A	Jasper silt loam, 0 to 2 percent slopes	1,971	0.4
440B	Jasper silt loam, 2 to 5 percent slopes	6,403	1.4
440C2	Jasper silt loam, 5 to 10 percent slopes, eroded	1,019	0.2
447	Canisteo silt loam, sandy substratum	6,671	1.4
451	Lawson silt loam	1,588	0.3
490A	Odell silt loam, 0 to 3 percent slopes	4,791	1.0
501	Morocco loamy fine sand	724	0.2
503B	Rockton silt loam, 2 to 5 percent slopes	1,072	0.2
503C2	Rockton silt loam, 5 to 10 percent slopes, eroded	624	0.1
504D	Sogn loam, 7 to 15 percent slopes	682	0.1
504F	Sogn loam, 15 to 35 percent slopes	705	0.2
506B2	Hitt loam, 2 to 5 percent slopes, eroded	563	0.1
508	Selma loam, bedrock substratum	330	0.1
509B	Whalan loam, 2 to 7 percent slopes	254	0.1
509D	Whalan loam, 7 to 15 percent slopes	858	0.2
509F	Whalan loam, 15 to 35 percent slopes	315	0.1
570A	Martinsville silt loam, 0 to 2 percent slopes	508	0.1
570B	Martinsville silt loam, 2 to 5 percent slopes	1,451	0.3
570C2	Martinsville silt loam, 5 to 10 percent slopes, eroded	661	0.1
570D	Martinsville silt loam, 10 to 15 percent slopes	454	0.1
627B2	Miami fine sandy loam, 2 to 5 percent slopes, eroded	587	0.1
627C2	Miami fine sandy loam, 5 to 10 percent slopes, eroded	498	0.1
648	Clyde clay loam	14,543	3.1
649	Nachusa silt loam	7,828	1.7
650B	Prairieville silt loam, 1 to 5 percent slopes	4,015	0.9
727A	Waukee silt loam, 0 to 3 percent slopes	4,750	1.0
741D3	Oakville fine sand, 7 to 20 percent slopes, severely eroded	588	0.1
742B2	Dickinson sandy loam, loamy substratum, 1 to 5 percent slopes, eroded	1,759	0.4
742C2	Dickinson sandy loam, loamy substratum, 5 to 10 percent slopes, eroded	371	0.1
761D	Eleva fine sandy loam, 7 to 15 percent slopes	485	0.1
761F	Eleva fine sandy loam, 15 to 35 percent slopes	230	*
776	Comfrey loam	6,164	1.3
777	Adrian muck	619	0.1
779B	Chelsea fine sand, 1 to 7 percent slopes	7,430	1.6
779D	Chelsea fine sand, 7 to 20 percent slopes	3,976	0.8
779F	Chelsea fine sand, 20 to 35 percent slopes	381	0.1
781B	Friesland fine sandy loam, 1 to 4 percent slopes	857	0.2
802A	Orthents, loamy, nearly level	2,155	0.5
864	Pits, quarries	689	0.1
865	Pits, gravel	214	*
3067	Harpster silty clay loam, occasionally flooded	5,969	1.3
4200	Orio mucky sandy loam, ponded	1,245	0.3
4776	Comfrey silt loam, ponded	2,291	0.5
6206	Thorp Variant, silt loam	1,617	0.3
6397D	Boone Variant, loamy fine sand, 7 to 15 percent slopes	205	*
6397F	Boone Variant, loamy fine sand, 15 to 35 percent slopes	475	0.1
	Water	3,309	0.7
	Total	468,480	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name]

Map symbol	Soil name
27B	Miami silt loam, 2 to 5 percent slopes
36A	Tama silt loam, 0 to 2 percent slopes
36B	Tama silt loam, 2 to 5 percent slopes
41A	Muscatine silt loam, 0 to 3 percent slopes
45	Denny silt loam (where drained)
60B2	La Rose loam, 2 to 5 percent slopes, eroded
64B	Parr fine sandy loam, 2 to 5 percent slopes
64C2	Parr fine sandy loam, 5 to 10 percent slopes, eroded
67	Harpster silty clay loam (where drained)
68	Sable silty clay loam (where drained)
68+	Sable silt loam, overwash (where drained)
69	Milford silty clay loam (where drained)
73	Ross silt loam
76	Otter silt loam (where drained)
87A	Dickinson sandy loam, 0 to 3 percent slopes
87B	Dickinson sandy loam, 3 to 7 percent slopes
88B2	Sparta loamy sand, 1 to 7 percent slopes, eroded (where irrigated)
102	La Hogue loam
125	Selma loam (where drained)
145B2	Saybrook silt loam, 2 to 5 percent slopes, eroded
152	Drummer silty clay loam (where drained)
154A	Flanagan silt loam, 0 to 3 percent slopes
171B	Catlin silt loam, 1 to 5 percent slopes
172	Hoopeston fine sandy loam
198	Elburn silt loam
199A	Plano silt loam, 0 to 2 percent slopes
199B	Plano silt loam, 2 to 5 percent slopes
200	Orio sandy loam (where drained)
201	Gilford fine sandy loam (where drained)
204B2	Ayr sandy loam, 1 to 7 percent slopes, eroded
221B	Parr silt loam, 2 to 5 percent slopes
221B2	Parr silt loam, 2 to 5 percent slopes, eroded
233B	Birkbeck silt loam, 2 to 5 percent slopes
243A	St. Charles silt loam, 0 to 2 percent slopes
243B	St. Charles silt loam, 2 to 5 percent slopes
244	Hartsburg silty clay loam (where drained)
280B	Fayette silt loam, 2 to 5 percent slopes
290A	Warsaw loam, 0 to 2 percent slopes
290B2	Warsaw silt loam, 2 to 5 percent slopes, eroded
321	Du Page silt loam
329	Will loam (where drained)
332A	Billett fine sandy loam, 0 to 3 percent slopes
332B	Billett fine sandy loam, 3 to 7 percent slopes
332C2	Billett fine sandy loam, 5 to 12 percent slopes, eroded
350	Drummer silty clay loam, gravelly substratum (where drained)
351	Elburn silt loam, gravelly substratum
355A	Binghampton sandy loam, 0 to 3 percent slopes
357B	Vanpetten loam, 1 to 5 percent slopes
369A	Waupecan silt loam, 0 to 2 percent slopes
369B2	Waupecan silt loam, 2 to 5 percent slopes, eroded
379B2	Dakota sandy loam, 1 to 7 percent slopes, eroded
386B	Downs silt loam, 2 to 5 percent slopes
411B	Ashdale silt loam, 2 to 5 percent slopes
440A	Jasper silt loam, 0 to 2 percent slopes
440B	Jasper silt loam, 2 to 5 percent slopes
447	Canisteo silt loam, sandy substratum (where drained)
451	Lawson silt loam
490A	Odell silt loam, 0 to 3 percent slopes
501	Morocco loamy fine sand (where irrigated)
503B	Rockton silt loam, 2 to 5 percent slopes
506B2	Hitt loam, 2 to 5 percent slopes, eroded
508	Selma loam, bedrock substratum (where drained)
509B	Whalan loam, 2 to 7 percent slopes
570A	Martinsville silt loam, 0 to 2 percent slopes
570B	Martinsville silt loam, 2 to 5 percent slopes
627B2	Miami fine sandy loam, 2 to 5 percent slopes, eroded
648	Clyde clay loam (where drained)
649	Nachusa silt loam

TABLE 5.--PRIME FARMLAND--Continued

Map symbol	Soil name
650B	Prairieville silt loam, 1 to 5 percent slopes
727A	Waukee silt loam, 0 to 3 percent slopes
742B2	Dickinson sandy loam, loamy substratum, 1 to 5 percent slopes, eroded
742C2	Dickinson sandy loam, loamy substratum, 5 to 10 percent slopes, eroded
776	Comfrey loam (where drained)
779B	Chelsea fine sand, 1 to 7 percent slopes (where irrigated)
781B	Friesland fine sandy loam, 1 to 4 percent slopes
3067	Harpster silty clay loam, occasionally flooded (where drained)
6206	Thorp Variant, silt loam (where drained)

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
27B-------------- Miami	IIe	120	37	47	68	4.8	7.9
27C2------------- Miami	IIIe	114	35	40	64	4.5	7.5
27D3------------- Miami	IVe	100	32	36	60	4.0	7.0
27E-------------- Miami	VIe	---	---	---	---	3.0	---
36A-------------- Tama	I	155	46	62	89	5.9	9.8
36B-------------- Tama	IIe	153	46	61	88	5.8	9.7
36C2------------- Tama	IIIe	146	43	58	84	5.5	9.2
41A-------------- Muscatine	I	167	50	67	98	6.2	10.3
45--------------- Denny	IIw	113	37	47	62	4.0	6.7
60B2------------- La Rose	IIe	118	39	50	71	4.6	7.6
60C2------------- La Rose	IIIe	116	39	49	70	4.5	7.4
64B-------------- Parr	IIe	120	42	54	66	4.0	7.4
64C2------------- Parr	IIIe	105	37	47	62	3.4	7.1
67--------------- Harpster	IIw	136	44	52	74	5.0	8.3
68, 68+---------- Sable	IIw	156	51	61	85	5.6	9.3
69--------------- Milford	IIw	131	48	56	70	5.2	8.3
73--------------- Ross	I	140	46	56	80	5.5	9.2
76--------------- Otter	IIw	143	46	49	69	4.7	7.8
82--------------- Millington	Vw	---	---	---	---	---	4.5
87A-------------- Dickinson	IIs	99	32	45	62	3.0	6.5
87B-------------- Dickinson	IIIe	98	32	44	57	2.8	6.4

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
88B2------------ Sparta	IVs	60	---	---	40	2.5	3.4
88D2------------ Sparta	VIIs	---	---	---	---	2.0	3.0
93E------------- Rodman	VIs	---	---	---	---	0.7	2.0
102------------- La Hogue	I	129	43	56	80	5.2	8.7
103------------- Houghton	IIIw	115	34	---	---	---	---
125------------- Selma	IIw	90	35	35	50	3.3	5.5
145B2----------- Saybrook	IIe	133	44	58	81	5.4	9.1
145C2----------- Saybrook	IIIe	131	43	56	79	5.3	8.9
152------------- Drummer	IIw	154	51	61	83	5.5	9.2
154A------------ Flanagan	I	162	52	67	92	6.1	10.2
171B------------ Catlin	IIe	149	46	60	86	5.7	9.6
171C2----------- Catlin	IIIe	141	43	57	82	5.5	9.2
172------------- Hoopeston	IIs	105	33	47	70	4.1	6.8
198------------- Elburn	I	161	50	63	94	6.1	10.2
199A------------ Plano	I	151	45	60	90	5.8	9.7
199B------------ Plano	IIe	150	45	59	89	5.7	9.7
199C2----------- Plano	IIIe	143	43	57	86	5.5	9.2
200------------- Orio	IIw	112	37	47	64	4.1	6.8
201------------- Gilford	IIw	120	42	46	68	4.0	6.8
204B2----------- Ayr	IIe	113	33	44	60	4.3	7.5
221B------------ Parr	IIe	128	42	54	77	5.2	8.7
221B2----------- Parr	IIe	123	40	52	73	5.0	8.3
221C2----------- Parr	IIIe	121	37	47	71	4.8	8.1

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
233B------------ Birkbeck	IIe	122	41	54	69	4.9	8.2
233C2----------- Birkbeck	IIIe	116	38	52	66	4.7	7.8
243A------------ St. Charles	I	127	40	56	73	5.1	8.5
243B------------ St. Charles	IIe	126	39	55	72	5.0	8.4
244------------- Hartsburg	IIw	145	47	56	79	5.3	8.8
259C2----------- Assumption	IIIe	120	37	52	72	4.7	7.8
280B------------ Fayette	IIe	128	43	56	76	4.7	8.6
280C2----------- Fayette	IIIe	121	40	50	71	4.4	8.2
280D------------ Fayette	IIIe	120	38	49	70	4.2	7.2
290A------------ Warsaw	IIs	115	40	50	70	4.7	7.6
290B2----------- Warsaw	IIe	110	38	48	67	4.5	7.4
290C2----------- Warsaw	IIIe	108	36	42	66	4.3	7.2
321------------- Du Page	IIw	132	40	53	70	5.0	8.0
329------------- Will	IIw	117	43	53	73	4.5	7.0
332A------------ Billett	IIIs	89	31	40	57	3.7	6.1
332B------------ Billett	IIIe	86	30	39	56	3.6	6.1
332C2----------- Billett	IIIe	82	28	39	53	3.4	5.6
350------------- Drummer	IIw	146	47	55	80	5.2	7.0
351------------- Elburn	I	160	50	60	90	5.8	9.7
355A------------ Binghampton	IIs	119	37	50	72	4.5	---
357B------------ Vanpetten	IIe	112	35	48	68	4.3	---
361D2----------- Kidder	IIIe	91	31	40	60	3.5	6.1
363C2----------- Griswold	IIIe	105	39	53	71	4.5	7.5

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
363D2: Griswold	IIIe	101	32	50	68	4.3	7.2
369A: Waupecan	I	149	50	62	81	5.3	8.8
369B2: Waupecan	IIe	148	49	61	80	5.2	8.6
379B2: Dakota	IIe	103	35	47	65	4.3	7.0
386B: Downs	IIe	147	43	58	82	5.5	9.2
411B: Ashdale	IIe	115	39	52	73	5.0	8.2
411C2: Ashdale	IIIe	109	37	50	70	4.7	7.8
429C: Palsgrove	IIIe	104	35	45	60	4.3	6.5
440A: Jasper	I	138	42	57	88	5.3	8.8
440B: Jasper	IIe	137	42	56	87	5.2	8.7
440C2: Jasper	IIIe	130	40	54	84	5.1	8.4
447: Canisteo	IIw	132	44	53	77	5.3	8.8
451: Lawson	IIw	161	48	62	86	5.5	9.5
490A: Odell	I	143	46	58	85	5.5	9.3
501: Morocco	IVs	90	28	41	61	3.5	5.8
503B: Rockton	IIe	108	31	50	76	4.3	7.0
503C2: Rockton	IIIe	102	29	48	72	4.1	6.7
504D, 504F: Sogn	VIIs	---	---	---	---	1.6	2.6
506B2: Hitt	IIe	104	37	45	62	4.3	7.5
508: Selma	IIw	126	44	52	72	4.8	8.0
509B: Whalan	IIe	80	24	---	60	4.0	---
509D: Whalan	IIIe	70	21	---	53	3.5	---
509F: Whalan	VIe	---	---	---	---	3.0	5.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
570A------------ Martinsville	I	120	42	48	66	4.0	8.0
570B------------ Martinsville	IIe	120	42	48	65	4.0	7.9
570C2----------- Martinsville	IIIe	114	37	42	62	3.4	7.5
570D------------ Martinsville	IVe	113	33	38	59	3.1	7.2
627B2----------- Miami	IIe	105	37	47	60	3.4	6.7
627C2----------- Miami	IIIe	95	32	40	55	3.0	6.3
648------------- Clyde	IIw	141	45	56	82	5.0	8.2
649------------- Nachusa	I	143	50	64	91	5.6	9.3
650B------------ Prairieville	IIe	130	46	60	82	5.6	8.5
727A------------ Waukee	IIs	98	37	46	78	4.1	7.0
741D3----------- Oakville	VIs	---	---	---	---	1.8	3.0
742B2----------- Dickinson	IIe	109	33	46	69	3.6	6.9
742C2----------- Dickinson	IIIe	102	30	44	63	3.3	6.7
761D------------ Eleva	IVe	65	---	---	34	2.2	3.6
761F------------ Eleva	VIe	---	---	---	---	2.0	3.1
776------------- Comfrey	IIw	100	40	45	66	4.6	8.3
777------------- Adrian	Vw	---	---	---	---	---	---
779B------------ Chelsea	IVs	66	21	36	42	2.0	4.2
779D------------ Chelsea	VIs	---	---	---	---	1.5	3.9
779F------------ Chelsea	VIIs	---	---	---	---	1.0	3.0
781B------------ Friesland	IIe	110	38	47	66	5.0	7.3
802A**. Orthents							
864**, 865**. Pits							

See footnote at end of table.

TABLE 6.--LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Grass-legume hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Ton	AUM*
3067------------- Harpster	IIw	123	40	47	67	4.5	---
4200------------- Orio	Vw	---	---	---	---	---	---
4776------------- Comfrey	VIw	---	---	---	---	---	---
6206------------- Thorp Variant	IIw	105	33	42	52	3.8	6.0
6397D------------ Boone Variant	VIIs	---	---	---	---	---	---
6397F------------ Boone Variant	VIIs	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	
27B, 27C2, 27D3---- Miami	1o	Slight	Slight	Slight	Slight	White oak----------- Yellow-poplar------- Northern red oak----	90 98 90	Black walnut, yellow-poplar, white ash, eastern white pine, red pine.
27E---------------- Miami	1r	Moderate	Moderate	Slight	Slight	White oak----------- Yellow-poplar------- Northern red oak----	90 98 90	Black walnut, yellow-poplar, white ash, eastern white pine, red pine.
82----------------- Millington	3w	Slight	Severe	Severe	Severe	Eastern cottonwood-- Silver maple-------- American sycamore--- Hackberry-----------	90 --- --- ---	Eastern cottonwood, silver maple, green ash, hackberry, American sycamore, swamp white oak.
233B, 233C2-------- Birkbeck	1o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak---- Green ash-----------	86 --- ---	White oak, northern red oak, green ash, black walnut, eastern white pine, red pine.
280C2, 280D-------- Fayette	2o	Slight	Slight	Slight	Slight	White oak----------- Northern red oak---- Yellow-poplar------- Black walnut--------	80 80 90 ---	Eastern white pine, northern red oak, green ash, yellow-poplar.
509B, 509D--------- Whalan	4o	Slight	Slight	Slight	Slight	Eastern white pine-- Northern red oak---- White oak----------- Black walnut--------	58 60 60 55	Northern red oak, white oak, silver maple, eastern white pine.
509F--------------- Whalan	5r	Moderate	Moderate	Moderate	Slight	Eastern white pine-- Northern red oak---- American basswood--- Bur oak-------------	55 55 55 52	White oak, northern red oak, eastern white pine, American basswood.
570D--------------- Martinsville	1o	Slight	Slight	Slight	Slight	White oak----------- Yellow-poplar------- Sweetgum------------	90 98 76	Eastern white pine, red pine, white ash, yellow-poplar, black walnut.
627B2, 627C2------- Miami	1o	Slight	Slight	Slight	Slight	White oak----------- Yellow-poplar------- Northern red oak----	90 98 90	Black walnut, yellow-poplar, white ash, eastern white pine, red pine.
741D3-------------- Oakville	3s	Slight	Slight	Severe	Slight	White oak----------- Red pine------------ Eastern white pine-- Jack pine-----------	70 78 85 68	Eastern white pine, red pine, jack pine.
779B, 779D--------- Chelsea	3s	Slight	Slight	Moderate	Slight	White oak-----------	55	Eastern white pine, European larch, red pine.
779F--------------- Chelsea	3s	Moderate	Severe	Moderate	Slight	White oak-----------	55	Eastern white pine, European larch, red pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil]

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
27B, 27C2, 27D3, 27E Miami	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
36A, 36B, 36C2 Tama	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, northern white-cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
41A Muscatine	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
45 Denny	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern white-cedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
60B2, 60C2 La Rose	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
64B, 64C2 Parr	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
67 Harpster	---	Tatarian honeysuckle, nannyberry viburnum, Washington hawthorn.	White spruce, northern white-cedar, eastern redcedar, green ash, osageorange.	Black willow	---
68, 68+ Sable	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
69 Milford	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Washington hawthorn, Austrian pine, blue spruce, northern white-cedar, white fir, Norway spruce.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
73. Ross	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir, Austrian pine.	Norway spruce	Pin oak, eastern white pine.
76. Otter	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
82. Millington	---	Washington hawthorn, nannyberry viburnum, Tatarian honeysuckle.	Osageorange, green ash, eastern redcedar, northern white-cedar, white spruce.	Black willow	---
87A, 87B. Dickinson	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
88B2, 88D2. Sparta	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Austrian pine, jack pine, red pine.	Eastern white pine	---
93E. Rodman					
102. La Hogue	---	Silky dogwood, Amur honeysuckle, American cranberrybush, Amur privet.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Pin oak, eastern white pine.
103. Houghton	Common ninebark, whitebelle honeysuckle.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum, Tatarian honeysuckle.	Tall purple willow	Golden willow, black willow.	Imperial Carolina poplar.
125. Selma	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
145B2, 145C2------ Saybrook	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
152--------------- Drummer	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Norway spruce, Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine.	Eastern white pine	Pin oak.
154A-------------- Flanagan	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
171B, 171C2------- Catlin	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
172--------------- Hoopeston	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce-----	Eastern white pine, pin oak.
198--------------- Elburn	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, northern white-cedar, Washington hawthorn, blue spruce.	Norway spruce-----	Eastern white pine, pin oak.
199A, 199B, 199C2- Plano	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.
200--------------- Orio	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, Norway spruce, northern white-cedar, Austrian pine, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
201--------------- Gilford	---	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Norway spruce, northern white-cedar, Washington hawthorn, blue spruce, white fir, Austrian pine.	Eastern white pine	Pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
204B2: Ayr	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, northern white-cedar, eastern redcedar, osageorange.	Eastern white pine, red pine, Norway spruce.	---
221B, 221B2, 221C2: Parr	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
233B, 233C2: Birkbeck	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Pin oak, eastern white pine.
243A, 243B: St. Charles	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
244: Hartsburg	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
259C2: Assumption	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
280B, 280C2, 280D: Fayette	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
290A, 290B2, 290C2: Warsaw	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
321: Du Page	---	Tatarian honeysuckle, Siberian peashrub.	Green ash, osageorange, eastern redcedar, northern white-cedar, white spruce, nannyberry viburnum, Washington hawthorn.	Black willow	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of-- <8	8-15	16-25	26-35	>35
329 Will	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
332A, 332B, 332C2 Billett	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, northern white-cedar, osageorange, eastern redcedar.	Eastern white pine, Norway spruce, red pine.	---
350 Drummer	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
351 Elburn	---	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, northern white-cedar, Washington hawthorn, blue spruce.	Norway spruce	Eastern white pine, pin oak.
355A Binghampton	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
357B Vanpetten	Siberian peashrub	Tatarian honeysuckle, lilac, Amur honeysuckle, autumn-olive, Washington hawthorn, radiant crabapple, eastern redcedar.	Jack pine, red pine, Austrian pine, eastern white pine.	---	---
361D2 Kidder	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
363C2, 363D2 Griswold	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
369A, 369B2 Waupecan	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir.	Austrian pine, Norway spruce.	Pin oak, eastern white pine.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
379B2: Dakota	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
386B: Downs	---	American cranberrybush, Amur honeysuckle, autumn-olive, silky dogwood.	Blue spruce, northern white-cedar, Washington hawthorn, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
411B, 411C2: Ashdale	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
429C: Palsgrove	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
440A, 440B, 440C2: Jasper	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, northern white-cedar, blue spruce, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
447: Canisteo	---	Nannyberry viburnum, Tatarian honeysuckle, Washington hawthorn.	Eastern redcedar, white spruce, northern white-cedar, green ash.	Black willow	---
451: Lawson	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
490A: Odell	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, Austrian pine, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
501: Morocco	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
503B, 503C2: Rockton	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
504D, 504F. Sogn					
506B2: Hitt	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
508: Selma	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, Austrian pine, white fir, blue spruce, Norway spruce, northern white-cedar.	Eastern white pine	Pin oak.
509B, 509D, 509F: Whalan	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
570A, 570B, 570C2, 570D: Martinsville	---	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
627B2, 627C2: Miami	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
648: Clyde	---	American cranberrybush, Amur privet, silky dogwood, Amur honeysuckle.	White fir, blue spruce, northern white-cedar, Washington hawthorn, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
649: Nachusa	---	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce	Eastern white pine, pin oak.
650B: Prairieville	---	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
727A----------------- Waukee	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
741D3----------------- Oakville	Siberian peashrub	Eastern redcedar, lilac, radiant crabapple, autumn-olive, Washington hawthorn, Amur honeysuckle, Tatarian honeysuckle.	Red pine, Austrian pine, jack pine.	Eastern white pine	---
742B2, 742C2------ Dickinson	---	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, eastern redcedar, northern white-cedar, osageorange.	Eastern white pine, Norway spruce, red pine.	---
761D, 761F-------- Eleva	Siberian peashrub	Autumn-olive, eastern redcedar, radiant crabapple, Washington hawthorn, Amur honeysuckle, lilac, Tatarian honeysuckle.	Eastern white pine, Austrian pine, red pine, jack pine.	---	---
776----------------- Comfrey	---	Amur honeysuckle, Amur privet, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
777----------------- Adrian	Common ninebark, whitebelle honeysuckle.	Amur honeysuckle, Amur privet, silky dogwood, nannyberry viburnum, Tatarian honeysuckle.	Tall purple willow	Black willow, golden willow.	Imperial Carolina poplar.
779B, 779D, 779F-- Chelsea	Siberian peashrub	Eastern redcedar, radiant crabapple, Washington hawthorn, autumn-olive, Amur honeysuckle, lilac, Tatarian honeysuckle.	Austrian pine, jack pine, red pine.	Eastern white pine	---
781B----------------- Friesland	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
802A*. Orthents					
864*, 865*. Pits					
3067----------- Harpster	---	Tatarian honeysuckle, nannyberry viburnum, Washington hawthorn.	White spruce, northern white-cedar, eastern redcedar, green ash, osageorange.	Black willow------	---
4200----------- Orio	---	American cranberrybush, Amur honeysuckle, Amur privet, silky dogwood.	Blue spruce, Norway spruce, northern white-cedar, Austrian pine, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
4776----------- Comfrey	---	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
6206----------- Thorp Variant	---	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
6397D, 6397F. Boone Variant					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
27B Miami	Slight	Slight	Moderate: slope.	Slight	Slight.
27C2 Miami	Slight	Slight	Severe: slope.	Slight	Slight.
27D3 Miami	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
27E Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
36A Tama	Slight	Slight	Slight	Slight	Slight.
36B Tama	Slight	Slight	Moderate: slope.	Slight	Slight.
36C2 Tama	Slight	Slight	Severe: slope.	Slight	Slight.
41A Muscatine	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
45 Denny	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
60B2 La Rose	Slight	Slight	Moderate: slope.	Slight	Slight.
60C2 La Rose	Slight	Slight	Severe: slope.	Slight	Slight.
64B Parr	Slight	Slight	Moderate: slope.	Slight	Slight.
64C2 Parr	Slight	Slight	Severe: slope.	Slight	Slight.
67 Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
68, 68+ Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
69 Milford	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
73 Ross	Severe: flooding.	Slight	Slight	Slight	Slight.
76 Otter	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
82 Millington	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
87A Dickinson	Slight	Slight	Slight	Slight	Slight.
87B Dickinson	Slight	Slight	Moderate: slope.	Slight	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
88B2 Sparta	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
88D2 Sparta	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
93E Rodman	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: droughty, slope.
102 La Hogue	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
103 Houghton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.
125 Selma	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
145B2 Saybrook	Slight	Slight	Moderate: slope.	Slight	Slight.
145C2 Saybrook	Slight	Slight	Severe: slope.	Slight	Slight.
152 Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
154A Flanagan	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
171B Catlin	Slight	Slight	Moderate: slope.	Slight	Slight.
171C2 Catlin	Slight	Slight	Severe: slope.	Slight	Slight.
172 Hoopeston	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
198 Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
199A Plano	Slight	Slight	Slight	Slight	Slight.
199B Plano	Slight	Slight	Moderate: slope.	Slight	Slight.
199C2 Plano	Slight	Slight	Severe: slope.	Slight	Slight.
200 Orio	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
201 Gilford	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
204B2 Ayr	Slight	Slight	Moderate: slope.	Slight	Slight.
221B, 221B2 Parr	Slight	Slight	Moderate: slope.	Slight	Slight.
221C2 Parr	Slight	Slight	Severe: slope.	Slight	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
233B------------------ Birkbeck	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
233C2----------------- Birkbeck	Slight----------	Slight----------	Severe: slope.	Slight------------	Slight.
243A------------------ St. Charles	Slight----------	Slight----------	Slight----------	Slight------------	Slight.
243B------------------ St. Charles	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
244------------------- Hartsburg	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
259C2----------------- Assumption	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight------------	Moderate: slope.
280B------------------ Fayette	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
280C2----------------- Fayette	Slight----------	Slight----------	Severe: slope.	Slight------------	Slight.
280D------------------ Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
290A------------------ Warsaw	Slight----------	Slight----------	Moderate: small stones.	Slight------------	Slight.
290B2----------------- Warsaw	Slight----------	Slight----------	Moderate: slope, small stones.	Slight------------	Slight.
290C2----------------- Warsaw	Slight----------	Slight----------	Severe: slope.	Slight------------	Slight.
321------------------- Du Page	Severe: flooding.	Slight----------	Moderate: flooding.	Slight------------	Moderate: flooding.
329------------------- Will	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
332A------------------ Billett	Slight----------	Slight----------	Slight----------	Slight------------	Slight.
332B------------------ Billett	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
332C2----------------- Billett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight------------	Moderate: slope.
350------------------- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
351------------------- Elburn	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
355A------------------ Binghampton	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
357B------------------ Vanpetten	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
198 Elburn	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
199A, 199B Plano	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
199C2 Plano	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
200 Orio	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
201 Gilford	Severe: cutbanks cave, ponding.	Severe: ponding, flooding.	Severe: ponding, flooding.	Severe: ponding, flooding.	Severe: ponding, frost action, flooding.	Severe: ponding.
204B2 Ayr	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	
221B, 221B2 Parr	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: low strength, frost action, shrink-swell.	Slight.
221C2 Parr	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: low strength, frost action, shrink-swell.	Slight.
233B Birkbeck	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
233C2 Birkbeck	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
243A, 243B St. Charles	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
244 Hartsburg	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.
259C2 Assumption	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
280B Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
280C2 Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
280D Fayette	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
290A, 290B2 Warsaw	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
290C2 Warsaw	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
504F Sogn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.	Severe: slope, thin layer.
506B2 Hitt	Slight	Slight	Moderate: slope.	Slight	Slight.
508 Selma	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
509B Whalan	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, depth to rock, percs slowly.	Slight	Moderate: thin layer.
509D Whalan	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, thin layer.
509F Whalan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
570A Martinsville	Slight	Slight	Slight	Slight	Slight.
570B Martinsville	Slight	Slight	Moderate: slope.	Slight	Slight.
570C2 Martinsville	Slight	Slight	Severe: slope.	Slight	Slight.
570D Martinsville	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
627B2 Miami	Slight	Slight	Moderate: slope.	Slight	Slight.
627C2 Miami	Slight	Slight	Severe: slope.	Slight	Slight.
648 Clyde	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
649 Nachusa	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
650B Prairieville	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, percs slowly.	Slight	Slight.
727A Waukee	Slight	Slight	Slight	Slight	Slight.
741D3 Oakville	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: slope, droughty.
742B2 Dickinson	Slight	Slight	Moderate: slope.	Slight	Slight.
742C2 Dickinson	Slight	Slight	Severe: slope.	Slight	Slight.
761D Eleva	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope, thin layer.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
761F: Eleva	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
776: Comfrey	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
777: Adrian	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.
779B: Chelsea	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty.
779D: Chelsea	Severe: too sandy.	Severe: too sandy.	Severe: too sandy, slope.	Severe: too sandy.	Moderate: slope, droughty.
779F: Chelsea	Severe: too sandy, slope.	Severe: too sandy, slope.	Severe: too sandy, slope.	Severe: too sandy, slope.	Severe: slope.
781B: Friesland	Slight	Slight	Moderate: slope.	Slight	Slight.
802A*. Orthents					
864*, 865*. Pits					
3067: Harpster	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
4200: Orio	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
4776: Comfrey	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
6206: Thorp Variant	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, erodes easily.	Severe: ponding.
6397D: Boone Variant	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: thin layer.
6397F: Boone Variant	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
27B, 27C2, 27D3, 27E---------------- Miami	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
36A, 36B----------- Tama	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
36C2---------------- Tama	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
41A----------------- Muscatine	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
45------------------ Denny	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
60B2---------------- La Rose	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
60C2---------------- La Rose	Fair	Good	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
64B----------------- Parr	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
64C2---------------- Parr	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
67------------------ Harpster	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Fair.
68, 68+------------- Sable	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
69------------------ Milford	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
73------------------ Ross	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
76------------------ Otter	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
82------------------ Millington	Good	Good	Good	Good	Good	Good	Good	Good	Good.
87A----------------- Dickinson	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
87B----------------- Dickinson	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
88B2---------------- Sparta	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
88D2---------------- Sparta	Poor	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
93E----------------- Rodman	Very poor	Poor	Fair	Poor	Very poor	Very poor	Poor	Poor	Very poor.
102----------------- La Hogue	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
103 Houghton	Fair	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
125 Selma	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
145B2 Saybrook	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
145C2 Saybrook	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
152 Drummer	Fair	Good	Good	Fair	Good	Good	Good	Fair	Good.
154A Flanagan	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
171B, 171C2 Catlin	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
172 Hoopeston	Fair	Good	Good	Good	Fair	Poor	Good	Good	Poor.
198 Elburn	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
199A, 199B Plano	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
199C2 Plano	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
200 Orio	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
201 Gilford	Fair	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
204B2 Ayr	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
221B, 221B2 Parr	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
221C2 Parr	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
233B Birkbeck	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
233C2 Birkbeck	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
243A, 243B St. Charles	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
244 Hartsburg	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
259C2 Assumption	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
280B Fayette	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
280C2, 280D Fayette	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
290A, 290B2-------- Warsaw	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
290C2-------------- Warsaw	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
321---------------- Du Page	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor.
329---------------- Will	Fair	Good	Good	Good	Good	Good	Good	Good	Good.
332A--------------- Billett	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
332B, 332C2-------- Billett	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
350---------------- Drummer	Fair	Fair	Good	Fair	Good	Good	Fair	Fair	Good.
351---------------- Elburn	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
355A--------------- Binghampton	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.
357B--------------- Vanpetten	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
361D2-------------- Kidder	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
363C2, 363D2------- Griswold	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
369A, 369B2-------- Waupecan	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
379B2-------------- Dakota	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
386B--------------- Downs	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
411B--------------- Ashdale	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
411C2-------------- Ashdale	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
429C--------------- Palsgrove	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
440A, 440B--------- Jasper	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
440C2-------------- Jasper	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
447---------------- Canisteo	Good	Good	Fair	Fair	Good	Good	Fair	Fair	Good.
451---------------- Lawson	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
490A--------------- Odell	Fair	Good	Good	Good	Fair	Fair	Good	Good	Fair.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
501: Morocco	Poor	Fair	Good	Fair	Fair	Very poor	Fair	Fair	Poor.
503B, 503C2: Rockton	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
504D, 504F: Sogn	Very poor	Very poor	Poor	---	Very poor	Very poor	Very poor	---	Very poor.
506B2: Hitt	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
508: Selma	Good	Good	Good	Good	Good	Good	Good	Good	Good.
509B, 509D: Whalan	Fair	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
509F: Whalan	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
570A, 570B: Martinsville	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
570C2: Martinsville	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
570D: Martinsville	Poor	Fair	Good	Good	Very poor	Very poor	Fair	Good	Very poor.
627B2, 627C2: Miami	Fair	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor.
648: Clyde	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
649: Nachusa	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
650B: Prairieville	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
727A: Waukee	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor.
741D3: Oakville	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
742B2: Dickinson	Good	Good	Good	Good	Poor	Poor	Good	Good	Very poor.
742C2: Dickinson	Fair	Good	Good	Good	Very poor	Poor	Fair	Fair	Very poor.
761D: Eleva	Fair	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor.
761F: Eleva	Poor	Poor	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor.
776: Comfrey	Fair	Fair	Good	Fair	Good	Fair	Fair	Fair	Fair.
777: Adrian	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
779B: Chelsea	Poor	Fair	Fair	Poor	Very poor	Very poor	Fair	Poor	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements						Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hardwood trees	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
779D, 779F---------- Chelsea	Very poor	Fair	Fair	Poor	Very poor	Very poor	Poor	Poor	Very poor.
781B---------------- Friesland	Good	Good	Good	Poor	Very poor	Very poor	Good	Poor	Very poor.
802A*. Orthents									
864*, 865*. Pits									
3067---------------- Harpster	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
4200---------------- Orio	Poor	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
4776---------------- Comfrey	Poor	Poor	Fair	Very poor	Good	Good	Poor	Poor	Good.
6206---------------- Thorp Variant	Good	Good	Good	Fair	Good	Good	Good	Fair	Good.
6397D--------------- Boone Variant	Poor	Poor	Fair	Poor	Very poor	Very poor	Poor	Poor	Very poor.
6397F--------------- Boone Variant	Very poor	Poor	Fair	Poor	Very poor	Very poor	Poor	Poor	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
27B: Miami	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength.	Slight.
27C2: Miami	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
27D3: Miami	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
27E: Miami	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
36A, 36B: Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
36C2: Tama	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
41A: Muscatine	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Slight.
45: Denny	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.
60B2: La Rose	Slight	Slight	Slight	Slight	Severe: low strength.	Slight.
60C2: La Rose	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.	Slight.
64B: Parr	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: low strength, frost action.	Slight.
64C2: Parr	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.	Slight.
67: Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
68, 68+: Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
69: Milford	Severe: wetness.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.
73: Ross	Moderate: wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
76----------------- Otter	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.
82----------------- Millington	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
87A---------------- Dickinson	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Slight.
87B---------------- Dickinson	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Slight.
88B2--------------- Sparta	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
88D2--------------- Sparta	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
93E---------------- Rodman	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
102---------------- La Hogue	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action.	Moderate: wetness.
103---------------- Houghton	Severe: ponding, excess humus.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength, frost action.	Severe: excess humus, ponding.
125---------------- Selma	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.
145B2-------------- Saybrook	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
145C2-------------- Saybrook	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
152---------------- Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
154A--------------- Flanagan	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
171B--------------- Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
171C2-------------- Catlin	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
172---------------- Hoopeston	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
198 Elburn	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
199A, 199B Plano	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
199C2 Plano	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
200 Orio	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
201 Gilford	Severe: cutbanks cave, ponding.	Severe: ponding, flooding.	Severe: ponding, flooding.	Severe: ponding, flooding.	Severe: ponding, frost action, flooding.	Severe: ponding.
204B2 Ayr	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	
221B, 221B2 Parr	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Moderate: low strength, frost action, shrink-swell.	Slight.
221C2 Parr	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: low strength, frost action, shrink-swell.	Slight.
233B Birkbeck	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
233C2 Birkbeck	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
243A, 243B St. Charles	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
244 Hartsburg	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.
259C2 Assumption	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
280B Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
280C2 Fayette	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
280D Fayette	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
290A, 290B2 Warsaw	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
290C2 Warsaw	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
321 Du Page	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
329 Will	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
332A Billett	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
332B Billett	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
332C2 Billett	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
350 Drummer	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
351 Elburn	Severe: wetness, cutbanks cave.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action, low strength.	Moderate: wetness.
355A Binghampton	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action.	Moderate: wetness, droughty.
357B Vanpetten	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.	Slight.
361D2 Kidder	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action, shrink-swell.	Moderate: small stones, slope.
363C2 Griswold	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
363D2 Griswold	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
369A, 369B2 Waupecan	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
379B2 Dakota	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: low strength, frost action.	Slight.
386B Downs	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
411B Ashdale	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
411C2 Ashdale	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
429C Palsgrove	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
440A, 440B-------- Jasper	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: low strength, frost action.	Slight.
440C2------------- Jasper	Slight---------	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength, frost action.	Slight.
447--------------- Canisteo	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
451--------------- Lawson	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Moderate: wetness, flooding.
490A-------------- Odell	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: frost action.	Moderate: wetness.
501--------------- Morocco	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Moderate: wetness, droughty.
503B-------------- Rockton	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.	Moderate: thin layer.
503C2------------- Rockton	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.	Moderate: thin layer.
504D-------------- Sogn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
504F-------------- Sogn	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.
506B2------------- Hitt	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
508--------------- Selma	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding, frost action.	Severe: ponding.
509B-------------- Whalan	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: thin layer.
509D-------------- Whalan	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope, thin layer.
509F-------------- Whalan	Severe: slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell, slope.	Severe: slope.
570A, 570B-------- Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, frost action.	Slight.
570C2------------- Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
570D Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
627B2 Miami	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: low strength.	Slight.
627C2 Miami	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
648 Clyde	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
649 Nachusa	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
650B Prairieville	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
727A Waukee	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
741D3 Oakville	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
742B2 Dickinson	Severe: cutbanks cave.	Slight	Slight	Slight	Moderate: frost action.	Slight.
742C2 Dickinson	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
761D Eleva	Moderate: slope, depth to rock.	Moderate: slope.	Moderate: slope, depth to rock.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope, thin layer.
761F Eleva	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
776 Comfrey	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness.
777 Adrian	Severe: ponding, cutbanks cave, excess humus.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding, low strength, frost action.	Severe: excess humus, ponding.
779B Chelsea	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
779D Chelsea	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope, droughty.
779F Chelsea	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
781B Friesland	Moderate: dense layer.	Slight	Slight	Slight	Moderate: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
802A*. Orthents						
864*, 865*. Pits						
3067 Harpster	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding.
4200 Orio	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
4776 Comfrey	Severe: ponding, excess humus.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding.	Severe: flooding, ponding, low strength.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
6206 Thorp Variant	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
6397D Boone Variant	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: thin layer.
6397F Boone Variant	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, thin layer.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
27B Miami	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Good.
27C2 Miami	Moderate: percs slowly.	Severe: slope.	Slight	Good.
27D3 Miami	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Fair: slope.
27E Miami	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
36A Tama	Moderate: wetness.	Moderate: seepage, wetness.	Moderate: wetness.	Fair: too clayey.
36B Tama	Moderate: wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
36C2 Tama	Moderate: wetness.	Severe: slope.	Moderate: wetness.	Fair: too clayey.
41A Muscatine	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
45 Denny	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: ponding.
60B2 La Rose	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Fair: too clayey.
60C2 La Rose	Moderate: percs slowly.	Severe: slope.	Slight	Fair: too clayey.
64B Parr	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Good.
64C2 Parr	Moderate: percs slowly.	Severe: slope.	Slight	Good.
67 Harpster	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
68, 68+ Sable	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: hard to pack, ponding.
69 Milford	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
73 Ross	Moderate: flooding, wetness.	Severe: seepage.	Severe: seepage.	Good.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
76: Otter	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
82: Millington	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Poor: wetness.
87A, 87B: Dickinson	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy.
88B2: Sparta	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy.
88D2: Sparta	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Poor: seepage, too sandy.
93E: Rodman	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
102: La Hogue	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: too sandy.
103: Houghton	Severe: ponding, percs slowly.	Severe: seepage, ponding, excess humus.	Severe: ponding, seepage.	Poor: ponding, excess humus.
125: Selma	Severe: flooding, ponding.	Severe: seepage, flooding, ponding.	Severe: flooding, ponding.	Poor: too sandy, ponding.
145B2: Saybrook	Moderate: percs slowly, wetness.	Moderate: slope, seepage, wetness.	Moderate: wetness.	Fair: too clayey.
145C2: Saybrook	Moderate: percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Fair: too clayey.
152: Drummer	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
154A: Flanagan	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
171B: Catlin	Moderate: percs slowly, wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Poor: hard to pack.
171C2: Catlin	Moderate: percs slowly, wetness.	Severe: slope.	Moderate: wetness.	Poor: hard to pack.
172: Hoopeston	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
198 Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
199A, 199B Plano	Moderate: wetness, percs slowly.	Moderate: seepage, wetness.	Moderate: wetness.	Fair: too clayey.
199C2 Plano	Slight	Severe: slope.	Slight	Fair: too clayey.
200 Orio	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: ponding.	Poor: seepage, too sandy, ponding.
201 Gilford	Severe: ponding, poor filter, flooding.	Severe: seepage, ponding, flooding.	Severe: seepage, ponding, flooding.	Poor: seepage, too sandy, ponding.
204B2 Ayr	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Good.
221B, 221B2 Parr	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Good.
221C2 Parr	Moderate: percs slowly.	Severe: slope.	Slight	Good.
233B Birkbeck	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
233C2 Birkbeck	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Fair: too clayey, wetness.
243A St. Charles	Slight	Moderate: seepage.	Slight	Fair: too clayey.
243B St. Charles	Slight	Moderate: seepage, slope.	Slight	Fair: too clayey.
244 Hartsburg	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: hard to pack, ponding.
259C2 Assumption	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: slope.	Poor: thin layer.
280B Fayette	Slight	Moderate: slope, seepage.	Slight	Fair: too clayey.
280C2 Fayette	Slight	Severe: slope.	Slight	Fair: too clayey.
280D Fayette	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: slope, too clayey.
290A, 290B2 Warsaw	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy, small stones.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
290C2: Warsaw	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Poor: seepage, too sandy, small stones.
321: Du Page	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding.	Good.
329: Will	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
332A, 332B: Billett	Slight	Severe: seepage.	Severe: seepage.	Fair: too sandy, thin layer.
332C2: Billett	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Fair: too sandy, slope, thin layer.
350: Drummer	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Poor: ponding.
351: Elburn	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
355A: Binghampton	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: seepage.	Poor: seepage, too sandy.
357B: Vanpetten	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: seepage.	Poor: seepage, too sandy.
361D2: Kidder	Moderate: slope.	Severe: seepage, slope.	Severe: seepage.	Poor: small stones.
363C2: Griswold	Slight	Severe: slope.	Slight	Fair: small stones.
363D2: Griswold	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: small stones, slope.
369A, 369B2: Waupecan	Moderate: wetness.	Severe: seepage.	Severe: seepage.	Fair: too clayey, thin layer.
379B2: Dakota	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: seepage, too sandy, small stones.
386B: Downs	Moderate: wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
411B: Ashdale	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Moderate: depth to rock.	Fair: area reclaim, too clayey.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
411C2: Ashdale	Severe: percs slowly.	Severe: slope.	Moderate: depth to rock.	Fair: area reclaim, too clayey.
429C: Palsgrove	Moderate: depth to rock, percs slowly.	Severe: slope.	Moderate: depth to rock.	Poor: thin layer.
440A: Jasper	Slight	Moderate: seepage.	Slight	Fair: too clayey.
440B: Jasper	Slight	Moderate: seepage, slope.	Slight	Fair: too clayey.
440C2: Jasper	Slight	Severe: slope.	Slight	Fair: too clayey.
447: Canisteo	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
451: Lawson	Severe: flooding, wetness.	Severe: wetness.	Severe: flooding, wetness.	Poor: wetness.
490A: Odell	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
501: Morocco	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: too sandy, wetness, seepage.
503B: Rockton	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
503C2: Rockton	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: area reclaim.
504D: Sogn	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: area reclaim.
504F: Sogn	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
506B2: Hitt	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Moderate: depth to rock.	Fair: area reclaim, too clayey.
508: Selma	Severe: flooding, ponding.	Severe: wetness.	Severe: flooding, ponding.	Poor: ponding.
509B: Whalan	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
509D: Whalan	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Poor: area reclaim.
509F: Whalan	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
570A----------------- Martinsville	Slight---------------	Moderate: seepage.	Slight----------------	Fair: too clayey, thin layer.
570B----------------- Martinsville	Slight---------------	Moderate: seepage, slope.	Slight----------------	Fair: too clayey, thin layer.
570C2---------------- Martinsville	Slight---------------	Severe: slope.	Slight----------------	Fair: too clayey, thin layer.
570D----------------- Martinsville	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: too clayey, slope, thin layer.
627B2---------------- Miami	Moderate: percs slowly.	Moderate: seepage, slope.	Slight----------------	Good.
627C2---------------- Miami	Moderate: percs slowly.	Severe: slope.	Slight----------------	Good.
648------------------ Clyde	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
649------------------ Nachusa	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Poor: too clayey.
650B----------------- Prairieville	Severe: percs slowly.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
727A----------------- Waukee	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: too sandy, seepage.
741D3---------------- Oakville	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Poor: too sandy, seepage.
742B2---------------- Dickinson	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Good.
742C2---------------- Dickinson	Severe: poor filter.	Severe: slope, seepage.	Severe: seepage.	Good.
761D----------------- Eleva	Severe: depth to rock.	Severe: slope, seepage, depth to rock.	Severe: seepage, depth to rock.	Poor: area reclaim.
761F----------------- Eleva	Severe: depth to rock, slope.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage, depth to rock.	Poor: slope, area reclaim.
776------------------ Comfrey	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
777------------------ Adrian	Severe: ponding, poor filter.	Severe: seepage, ponding, excess humus.	Severe: ponding, seepage.	Poor: ponding, excess humus.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
779B: Chelsea	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Poor: too sandy, seepage.
779D: Chelsea	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Poor: too sandy, seepage.
779F: Chelsea	Severe: slope, poor filter.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: too sandy, slope, seepage.
781B: Friesland	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Good.
802A*. Orthents				
864*, 865*. Pits				
3067: Harpster	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: hard to pack, ponding.
4200: Orio	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: ponding.	Poor: seepage, too sandy, ponding.
4776: Comfrey	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
6206: Thorp Variant	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: ponding.
6397D: Boone Variant	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Poor: area reclaim, seepage, too sandy.
6397F: Boone Variant	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, seepage, too sandy.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
27B, 27C2 Miami	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
27D3 Miami	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
27E Miami	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
36A, 36B, 36C2 Tama	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
41A Muscatine	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
45 Denny	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
60B2, 60C2 La Rose	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
64B, 64C2 Parr	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
67 Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
68, 68+ Sable	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
69 Milford	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
73 Ross	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
76 Otter	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
82 Millington	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
87A, 87B Dickinson	Good	Probable	Improbable: too sandy.	Good.
88B2 Sparta	Good	Probable	Improbable: too sandy.	Fair: too sandy.
88D2 Sparta	Good	Probable	Improbable: too sandy.	Fair: slope, too sandy.
93E Rodman	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
102 La Hogue	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
103 Houghton	Poor: wetness, low strength.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness, excess humus.
125 Selma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
145B2, 145C2 Saybrook	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
152 Drummer	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
154A Flanagan	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
171B, 171C2 Catlin	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
172 Hoopeston	Fair: wetness.	Probable	Improbable: too sandy.	Fair: small stones, thin layer.
198 Elburn	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
199A, 199B, 199C2 Plano	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
200 Orio	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
201 Gilford	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
204B2 Ayr	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, small stones.
221B, 221B2, 221C2 Parr	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
233B, 233C2 Birkbeck	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
243A, 243B St. Charles	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
244 Hartsburg	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
259C2 Assumption	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
280B, 280C2 Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
280D Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer.
290A, 290B2, 290C2 Warsaw	Good	Probable	Probable	Poor: small stones, area reclaim.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
321 Du Page	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
329 Will	Poor: wetness.	Probable	Probable	Poor: area reclaim, wetness.
332A, 332B Billett	Good	Probable	Improbable: too sandy.	Good.
332C2 Billett	Good	Probable	Improbable: too sandy.	Fair: slope.
350 Drummer	Poor: wetness.	Probable	Probable	Poor: area reclaim, wetness.
351 Elburn	Fair: wetness.	Probable	Probable	Good.
355A Binghampton	Fair: thin layer, wetness.	Improbable: thin layer.	Improbable: too sandy.	Fair: area reclaim, thin layer.
357B Vanpetten	Fair: thin layer.	Improbable: thin layer.	Improbable: too sandy.	Fair: area reclaim, thin layer.
361D2 Kidder	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
363C2 Griswold	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
363D2 Griswold	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
369A, 369B2 Waupecan	Good	Probable	Probable	Poor: area reclaim.
379B2 Dakota	Good	Probable	Probable	Poor: small stones, area reclaim.
386B Downs	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
411B, 411C2 Ashdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
429C Palsgrove	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
440A, 440B, 440C2 Jasper	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
447 Canisteo	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
451 Lawson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
490A Odell	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
501 Morocco	Fair: wetness.	Probable	Improbable: too sandy.	Fair: too sandy.
503B, 503C2 Rockton	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
504D Sogn	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
504F Sogn	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
506B2 Hitt	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
508 Selma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
509B Whalan	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
509D Whalan	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
509F Whalan	Poor: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
570A, 570B, 570C2 Martinsville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
570D Martinsville	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
627B2, 627C2 Miami	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
648 Clyde	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
649 Nachusa	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
650B Prairieville	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
727A Waukee	Good	Probable	Probable	Good.
741D3 Oakville	Good	Probable	Improbable: too sandy.	Poor: too sandy.
742B2, 742C2 Dickinson	Good	Improbable: thin layer.	Improbable: excess fines.	Good.
761D Eleva	Poor: area reclaim.	Improbable: thin layer.	Improbable: excess fines.	Fair: slope, area reclaim, small stones.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
761F: Eleva	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: excess fines.	Poor: slope.
776: Comfrey	Poor: wetness.	Probable	Probable	Poor: wetness.
777: Adrian	Poor: wetness, low strength.	Probable	Improbable: too sandy.	Poor: wetness, excess humus.
779B, 779D: Chelsea	Good	Probable	Improbable: too sandy.	Poor: too sandy.
779F: Chelsea	Poor: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
781B: Friesland	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
802A*. Orthents				
864*, 865*. Pits				
3067: Harpster	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
4200: Orio	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
4776: Comfrey	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
6206: Thorp Variant	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
6397D: Boone Variant	Poor: area reclaim.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim.
6397F: Boone Variant	Poor: area reclaim, slope.	Improbable: thin layer.	Improbable: too sandy.	Poor: area reclaim, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
27B, 27C2 Miami	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
27D3, 27E Miami	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
36A Tama	Moderate: seepage.	Slight	Deep to water	Favorable	Erodes easily	Erodes easily.
36B, 36C2 Tama	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
41A Muscatine	Moderate: seepage.	Moderate: wetness.	Frost action	Wetness	Wetness, erodes easily.	Erodes easily.
45 Denny	Slight	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
60B2, 60C2 La Rose	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope	Favorable	Favorable.
64B, 64C2 Parr	Moderate: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, slope.	Soil blowing	Favorable.
67 Harpster	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
68, 68+ Sable	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding	Ponding	Wetness.
69 Milford	Moderate: seepage.	Severe: ponding.	Flooding, ponding, frost action.	Ponding, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
73 Ross	Severe: seepage.	Severe: piping.	Deep to water	Favorable	Favorable	Favorable.
76 Otter	Moderate: seepage.	Severe: piping, ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
82 Millington	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
87A Dickinson	Severe: seepage.	Severe: seepage.	Deep to water	Soil blowing	Soil blowing, too sandy.	Favorable.
87B Dickinson	Severe: seepage.	Severe: seepage.	Deep to water	Soil blowing, slope.	Soil blowing, too sandy.	Favorable.
88B2 Sparta	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
88D2 Sparta	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
93E Rodman	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, too sandy.	Slope, droughty.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
102----------------La Hogue	Severe: seepage.	Severe: piping, wetness.	Frost action, cutbanks cave.	Wetness---------	Wetness, too sandy.	Wetness.
103----------------Houghton	Severe: seepage.	Severe: excess humus, ponding.	Frost action, subsides, ponding.	Soil blowing, ponding.	Ponding, soil blowing.	Wetness.
125----------------Selma	Moderate: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding, too sandy.	Wetness.
145B2, 145C2-------Saybrook	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope-----------	Erodes easily	Erodes easily.
152----------------Drummer	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding---------	Ponding---------	Wetness.
154A---------------Flanagan	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness---------	Erodes easily, wetness.	Wetness, erodes easily.
171B, 171C2--------Catlin	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Deep to water	Slope-----------	Erodes easily	Erodes easily.
172----------------Hoopeston	Severe: seepage.	Severe: seepage, piping, wetness.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
198----------------Elburn	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness---------	Erodes easily, wetness.	Wetness, erodes easily.
199A---------------Plano	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Deep to water	Favorable-------	Erodes easily	Erodes easily.
199B---------------Plano	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Deep to water	Slope-----------	Erodes easily	Erodes easily.
199C2--------------Plano	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope-----------	Erodes easily	Erodes easily.
200----------------Orio	Moderate: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
201----------------Gilford	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
204B2--------------Ayr	Severe: seepage.	Severe: piping.	Deep to water	Droughty, fast intake, soil blowing.	Erodes easily, soil blowing.	Erodes easily, droughty.
221B, 221B2, 221C2-------------Parr	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope-----------	Favorable-------	Favorable.
233B, 233C2--------Birkbeck	Moderate: seepage, slope.	Moderate: thin layer, piping, wetness.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
243A-- St. Charles	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
243B-- St. Charles	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
244-- Hartsburg	Moderate: seepage.	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
259C2-- Assumption	Severe: slope.	Moderate: piping.	Deep to water	Slope--	Slope, erodes easily.	Slope, erodes easily.
280B, 280C2-- Fayette	Moderate: slope, seepage.	Slight--	Deep to water	Slope, erodes easily.	Favorable--	Erodes easily.
280D-- Fayette	Severe: slope.	Slight--	Deep to water	Slope, erodes easily.	Slope--	Slope, erodes easily.
290A-- Warsaw	Severe: seepage.	Severe: seepage.	Deep to water	Favorable--	Too sandy--	Favorable.
290B2, 290C2-- Warsaw	Severe: seepage.	Severe: seepage.	Deep to water	Slope--	Too sandy--	Favorable.
321-- Du Page	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Flooding--	Favorable--	Favorable.
329-- Will	Severe: seepage.	Severe: seepage, wetness.	Flooding, frost action, cutbanks cave.	Wetness, flooding.	Wetness, too sandy.	Wetness.
332A-- Billett	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing--	Too sandy, soil blowing.	Favorable.
332B-- Billett	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, slope.	Too sandy, soil blowing.	Favorable.
332C2-- Billett	Severe: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, slope.	Slope, too sandy, soil blowing.	Slope.
350-- Drummer	Moderate: seepage.	Severe: ponding.	Ponding, frost action.	Ponding--	Ponding--	Wetness.
351-- Elburn	Moderate: seepage.	Severe: wetness.	Frost action--	Wetness--	Wetness, erodes easily.	Wetness, erodes easily.
355A-- Binghampton	Severe: seepage.	Severe: seepage, piping.	Frost action, cutbanks cave.	Wetness, droughty, soil blowing.	Erodes easily, wetness, too sandy.	Erodes easily, droughty, rooting depth.
357B-- Vanpetten	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope--	Erodes easily, too sandy.	Erodes easily.
361D2-- Kidder	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope--	Slope--	Slope.
363C2-- Griswold	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope--	Favorable--	Favorable.
363D2-- Griswold	Severe: slope.	Severe: piping.	Deep to water	Slope--	Slope--	Slope.
369A-- Waupecan	Severe: seepage.	Moderate: thin layer.	Deep to water	Rooting depth	Erodes easily	Erodes easily, rooting depth.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
369B2 Waupecan	Severe: seepage.	Moderate: thin layer.	Deep to water	Rooting depth, slope.	Erodes easily	Erodes easily, rooting depth.
379B2 Dakota	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing, slope.	Too sandy, soil blowing.	Favorable.
386B Downs	Moderate: seepage, slope.	Slight	Deep to water	Slope	Erodes easily	Erodes easily.
411B, 411C2 Ashdale	Moderate: seepage, depth to rock, slope.	Moderate: thin layer.	Deep to water	Percs slowly, slope.	Erodes easily	Erodes easily.
429C Palsgrove	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Slope	Erodes easily	Erodes easily.
440A Jasper	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Favorable	Favorable	Favorable.
440B, 440C2 Jasper	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
447 Canisteo	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
451 Lawson	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
490A Odell	Slight	Severe: piping, wetness.	Frost action	Wetness	Wetness, erodes easily.	Wetness, erodes easily.
501 Morocco	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Droughty, fast intake, wetness.	Wetness, too sandy, soil blowing.	Wetness, droughty.
503B, 503C2 Rockton	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope.	Depth to rock	Depth to rock.
504D, 504F Sogn	Severe: depth to rock, slope.	Slight	Deep to water	Depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock.
506B2 Hitt	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Percs slowly, slope.	Favorable	Favorable.
508 Selma	Moderate: seepage, depth to rock.	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding	Wetness.
509B Whalan	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Depth to rock	Depth to rock, percs slowly.
509D, 509F Whalan	Severe: slope.	Severe: thin layer.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock.	Slope, depth to rock, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
570A Martinsville	Moderate: seepage.	Severe: thin layer.	Deep to water	Favorable	Erodes easily	Erodes easily.
570B, 570C2 Martinsville	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope	Erodes easily	Erodes easily.
570D Martinsville	Severe: slope.	Severe: thin layer.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
627B2, 627C2 Miami	Moderate: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, slope.	Erodes easily, soil blowing.	Erodes easily.
648 Clyde	Moderate: seepage.	Severe: wetness.	Frost action	Wetness	Wetness	Wetness, erodes easily.
649 Nachusa	Moderate: seepage.	Severe: thin layer.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
650B Prairieville	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
727A Waukee	Severe: seepage.	Severe: seepage.	Deep to water	Favorable	Too sandy	Favorable.
741D3 Oakville	Severe: seepage, slope.	Severe: piping, seepage.	Deep to water	Fast intake, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
742B2, 742C2 Dickinson	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing, slope.	Too sandy, soil blowing.	Favorable.
761D, 761F Eleva	Severe: slope, seepage.	Severe: piping.	Deep to water	Soil blowing, depth to rock, slope.	Slope, depth to rock, soil blowing.	Slope, depth to rock.
776 Comfrey	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness, flooding.	Wetness	Wetness.
777 Adrian	Severe: seepage.	Severe: seepage, ponding, excess humus.	Ponding, frost action, subsides.	Ponding, soil blowing.	Ponding, soil blowing, too sandy.	Wetness.
779B Chelsea	Severe: seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
779D, 779F Chelsea	Severe: slope, seepage.	Severe: piping, seepage.	Deep to water	Droughty, fast intake, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
781B Friesland	Moderate: seepage.	Severe: thin layer.	Deep to water	Soil blowing	Soil blowing	Favorable.
802A*. Orthents						
864*, 865*. Pits						
3067 Harpster	Moderate: seepage.	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Erodes easily, ponding.	Wetness, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
4200-------------- Orio	Moderate: seepage.	Severe: seepage, piping, ponding.	Ponding, frost action, cutbanks cave.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
4776-------------- Comfrey	Moderate: seepage.	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding--------	Wetness.
6206-------------- Thorp Variant	Moderate: seepage.	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
6397D, 6397F------ Boone Variant	Severe: depth to rock, slope.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Slope, depth to rock, too sandy.	Slope, droughty, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
27B, 27C2--------- Miami	0-6	Silt loam---------	CL	A-4, A-6	0-2	95-100	90-100	76-95	55-75	25-35	8-15
	6-26	Clay loam---------	CL	A-6, A-7	0-2	90-100	90-95	80-95	60-76	30-45	10-20
	26-60	Loam--------------	CL, CL-ML	A-4, A-6	0-2	90-100	90-95	76-90	55-75	20-30	5-15
27D3--------------- Miami	0-7	Clay loam---------	CL	A-6	0-2	95-100	90-100	80-100	60-80	30-40	10-20
	7-24	Clay loam---------	CL	A-6, A-7	0-2	90-100	90-95	80-95	60-76	30-45	10-20
	24-60	Loam--------------	CL, CL-ML	A-4, A-6	0-2	90-100	90-95	76-90	55-75	20-30	5-15
27E---------------- Miami	0-6	Loam--------------	CL	A-4, A-6	0-2	95-100	90-100	76-95	55-75	25-35	8-15
	6-30	Clay loam---------	CL	A-6, A-7	0-2	90-100	90-95	80-95	60-76	30-45	10-20
	30-60	Loam--------------	CL, CL-ML	A-4, A-6	0-2	90-100	90-95	76-90	55-75	20-30	5-15
36A, 36B, 36C2--- Tama	0-13	Silt loam---------	ML	A-6, A-7	0	100	100	100	95-100	35-50	10-20
	13-51	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	15-25
	51-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
41A---------------- Muscatine	0-17	Silt loam---------	CL, CL-ML	A-6, A-4	0	100	100	100	95-100	25-40	5-15
	17-40	Silty clay loam	CL	A-7	0	100	100	100	95-100	40-50	20-30
	40-60	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
45----------------- Denny	0-14	Silt loam---------	CL	A-6, A-4	0	100	100	95-100	95-100	30-40	8-15
	14-39	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-60	15-35
	39-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	25-40	11-20
60B2, 60C2-------- La Rose	0-7	Loam--------------	ML, CL	A-6, A-4	0	100	95-100	90-100	60-95	30-40	5-15
	7-19	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	95-100	90-100	85-100	60-95	30-45	15-25
	19-60	Loam, clay loam, silt loam.	CL	A-6	0-5	95-100	90-100	75-100	50-90	25-40	10-20
64B, 64C2--------- Parr	0-11	Fine sandy loam	SM, SM-SC	A-4	0	100	100	65-80	35-45	<25	2-7
	11-29	Clay loam, loam	CL	A-6, A-4	0	90-100	90-95	80-90	65-75	25-35	8-15
	29-60	Loam--------------	CL, ML, CL-ML	A-4	0-3	85-95	80-90	75-85	50-65	<25	2-8
67----------------- Harpster	0-13	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	20-35
	13-35	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	85-100	40-60	20-35
	35-60	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	100	95-100	95-100	70-100	35-55	20-35
68----------------- Sable	0-12	Silty clay loam	CL, OH, CH, OL	A-7	0	100	100	95-100	95-100	41-65	15-35
	12-51	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	51-60	Silt loam---------	CL	A-6	0	100	100	95-100	95-100	30-40	10-20
68+---------------- Sable	0-14	Silt loam---------	CL	A-6, A-7	0	100	100	95-100	95-100	30-45	10-20
	14-51	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-35
	51-60	Silt loam---------	CL	A-6	0	100	100	95-100	95-100	30-40	10-20
69----------------- Milford	0-23	Silty clay loam	CL, CH	A-7	0	100	95-100	90-100	80-95	40-60	20-35
	23-49	Silty clay, silty clay loam.	CH, CL	A-7	0	100	95-100	90-100	80-100	40-60	20-40
	49-60	Stratified silty clay to sandy loam.	CL	A-6, A-7	0	97-100	95-100	90-100	70-100	30-50	15-30
73----------------- Ross	0-23	Silt loam---------	ML, CL-ML, CL	A-4, A-6	0	90-100	90-100	80-100	65-95	20-35	NP-12
	23-55	Loam, silt loam, silty clay loam.	ML, CL, CL-ML	A-6, A-4, A-7	0	90-100	85-100	70-100	55-95	22-45	3-20
	55-60	Stratified gravelly sandy loam to silt loam.	CL, ML, SM, GM	A-6, A-4, A-2, A-1	0-5	65-100	55-100	35-100	20-80	<30	NP-12

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
76----------------- Otter	0-30	Silt loam--------	CL	A-6, A-7, A-4	0	100	95-100	90-100	80-100	25-45	7-20
	30-60	Silt loam, sandy loam, silty clay loam.	CL-ML, CL, SM-SC, SC	A-4, A-6, A-7	0	90-100	80-100	55-95	45-85	25-45	5-20
82----------------- Millington	0-12	Silty clay loam	CL, ML, OL	A-7, A-6	0	100	90-100	90-100	90-100	35-50	11-20
	12-46	Loam, silty clay loam, clay loam.	CL	A-7, A-6	0	95-100	90-100	80-100	70-95	28-50	10-22
	46-60	Stratified sandy loam to silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	80-100	80-100	80-100	60-95	20-45	5-20
87A, 87B--------- Dickinson	0-17	Sandy loam-------	SM, SC, SM-SC	A-4, A-2	0	100	100	85-95	30-50	15-30	NP-10
	17-29	Fine sandy loam, sandy loam.	SM, SC, SM-SC	A-4	0	100	100	85-95	35-50	15-30	NP-10
	29-48	Loamy sand, loamy fine sand, fine sand.	SM, SP-SM, SM-SC	A-2, A-3	0	100	100	80-95	5-20	10-20	NP-5
	48-60	Sand, loamy fine sand, loamy sand.	SM, SP-SM	A-3, A-2	0	100	100	70-90	5-20	---	NP
88B2, 88D2------- Sparta	0-8	Loamy sand-------	SM	A-2, A-4	0	85-100	85-100	50-95	15-50	---	NP
	8-34	Loamy fine sand, fine sand, sand.	SP-SM, SM	A-2, A-3, A-4	0	85-100	85-100	50-95	5-50	---	NP
	34-60	Sand, fine sand	SP-SM, SM, SP	A-2, A-3	0	85-100	85-100	50-95	2-30	---	NP
93E-------------- Rodman	0-7	Gravelly sandy loam.	SM-SC, SM	A-1, A-2, A-4	0-2	70-85	65-85	40-60	20-40	<25	NP-5
	7-15	Gravelly loam, sandy loam, loam.	ML, CL-ML, SM-SC, SM	A-4, A-2, A-1	0-2	70-85	60-85	40-75	20-55	<25	NP-5
	15-60	Stratified sand to gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	---	NP
102-------------- La Hogue	0-23	Loam-------------	ML, CL, CL-ML	A-4	0	100	95-100	80-100	50-80	20-35	3-10
	23-38	Sandy clay loam, silt loam, silty clay loam.	CL, SC	A-6, A-4	0	100	100	80-100	40-85	25-40	8-20
	38-60	Stratified sand to silt loam.	CL, CL-ML, SC, SM-SC	A-4, A-2	0	90-100	80-100	50-95	20-60	<25	5-10
103-------------- Houghton	0-60	Sapric material	PT	A-8	0	---	---	---	---	---	---
125-------------- Selma	0-18	Loam-------------	CL	A-4, A-6, A-7	0	100	90-100	85-95	60-80	30-45	8-20
	18-53	Loam, silt loam, clay loam.	ML	A-6, A-7	0	100	90-100	80-95	60-85	35-50	10-20
	53-60	Sandy loam, loamy sand, sand.	SM, SM-SC, SC, SP-SM	A-4, A-2, A-3	0	90-100	85-95	50-80	5-40	20-30	NP-10
145B2, 145C2----- Saybrook	0-8	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	90-100	25-40	5-15
	8-29	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	95-100	95-100	90-100	85-100	35-55	15-30
	29-60	Loam, silt loam, clay loam.	CL	A-6, A-4	0	95-100	85-100	80-95	60-85	20-40	8-25
152-------------- Drummer	0-16	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	16-46	Silty clay loam	CL	A-6, A-7	0	100	95-100	95-100	85-95	30-50	15-30
	46-60	Loam, silt loam, clay loam.	CL	A-6, A-7	0-5	95-100	90-100	75-95	60-85	30-50	15-30

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
154A-------------- Flanagan	0-14	Silt loam---------	CL	A-7, A-6	0	100	100	95-100	85-100	35-50	15-30
	14-41	Silty clay loam	CL, CH	A-7	0	100	100	95-100	85-100	40-60	15-30
	41-60	Loam, clay loam, silt loam.	CL, SC, CL-ML, SM-SC	A-4, A-6, A-7	0	85-100	80-100	70-95	36-85	20-45	5-30
171B, 171C2------- Catlin	0-11	Silt loam---------	ML, CL	A-6, A-7	0	100	100	95-100	85-100	30-50	11-20
	11-31	Silty clay loam	CL, CH	A-7, A-6	0	100	100	90-100	80-100	35-55	20-30
	31-60	Loam, silt loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-100	85-100	60-100	25-45	11-20
172--------------- Hoopeston	0-32	Fine sandy loam	SM	A-2, A-4	0	90-100	90-100	70-90	25-45	20-35	NP-10
	32-60	Loamy sand, sand, fine sand.	SP-SM, SM, SC, SM-SC	A-2, A-3	0	90-100	90-100	50-80	5-20	<25	NP-10
198--------------- Elburn	0-15	Silt loam---------	CL	A-6	0	100	100	95-100	90-100	25-40	10-25
	15-51	Silty clay loam	CL	A-6, A-7	0	100	100	100	75-90	30-50	15-35
	51-60	Loam, sandy loam, clay loam.	CL, CL-ML, SC, SM-SC	A-6, A-4, A-2	0	90-100	80-100	60-90	25-80	20-40	5-20
199A, 199B, 199C2------------ Plano	0-10	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-30	5-15
	10-56	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	95-100	25-40	10-25
	56-60	Stratified silt loam to sandy loam.	ML, SM, CL, SC	A-4, A-2	0-5	90-100	85-95	60-90	30-70	<25	NP-10
200--------------- Orio	0-11	Sandy loam--------	SM, SC, SM-SC	A-4, A-2-4	0	100	100	70-85	25-50	15-30	2-10
	11-21	Loam, sandy loam, loamy sand.	SM, SC, ML, CL	A-4, A-2-4	0	100	100	75-90	15-60	<35	2-10
	21-37	Sandy loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	100	100	80-95	35-75	30-45	10-20
	37-60	Loamy sand, sand, loamy fine sand.	SM, SC, SP-SM, SM-SC	A-2-4, A-3	0	100	100	60-90	5-35	20-30	NP-10
201--------------- Gilford	0-23	Fine sandy loam	SM, SC, SM-SC	A-4	0	95-100	90-100	65-80	35-45	<25	2-10
	23-40	Sandy loam, fine sandy loam.	SM, SC, SM-SC	A-2-4	0	90-100	90-100	55-70	20-35	15-30	NP-8
	40-60	Loamy sand, sand	SM, SP, SP-SM	A-3, A-1-b, A-2-4	0	90-100	85-100	18-60	3-20	---	NP
204B2------------- Ayr	0-8	Sandy loam--------	SM, SP-SM	A-2, A-3	0	100	95-100	50-80	5-35	---	NP
	8-27	Sand, fine sand, loamy sand.	SM, SP-SM	A-2, A-3	0	100	95-100	50-85	5-35	---	NP
	27-39	Loam--------------	CL, CL-ML	A-4	0-3	95-100	90-100	85-95	60-90	20-30	5-10
	39-60	Loam, sandy loam	CL-ML, CL	A-4	0-3	95-100	90-100	70-90	50-85	<25	5-10
221B, 221B2, 221C2------------ Parr	0-12	Silt loam---------	CL, CL-ML	A-4	0	100	95-100	80-100	50-90	20-30	4-10
	12-38	Clay loam, loam	CL	A-6, A-4	0	90-100	90-95	80-90	65-75	25-35	8-15
	38-60	Loam--------------	CL, ML, CL-ML	A-4	0-3	85-95	80-90	75-85	50-65	<25	2-8
233B, 233C2------- Birkbeck	0-9	Silt loam---------	CL, ML	A-4, A-6	0	100	100	95-100	95-100	28-40	5-15
	9-40	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	95-100	95-100	85-100	30-50	10-25
	40-60	Clay loam, loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0-5	95-100	85-100	70-100	55-80	25-45	5-20
243A, 243B-------- St. Charles	0-8	Silt loam---------	CL	A-4, A-6	0	100	100	95-100	95-100	22-35	7-15
	8-41	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
	41-60	Stratified silt loam to sandy loam.	CL-ML, CL, SM-SC, SC	A-2, A-4, A-6	0-5	90-100	80-90	60-90	30-70	15-35	5-15

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag-ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
244-------------- Hartsburg	0-16	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	10-20
	16-33	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	95-100	40-55	20-30
	33-60	Silt loam--------	CL	A-6	0	95-100	90-100	90-100	85-100	25-40	10-20
259C2------------ Assumption	0-7	Silt loam--------	CL	A-6, A-4	0	100	100	95-100	90-100	25-40	8-20
	7-31	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	10-30
	31-60	Clay loam, clay	CL	A-6, A-7	0-5	100	95-100	90-100	70-90	35-50	20-35
280B, 280C2, 280D------------ Fayette	0-6	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	6-45	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	45-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
290A------------- Warsaw	0-11	Loam-------------	CL, CL-ML	A-4, A-6	0	80-100	75-100	70-100	50-90	20-30	4-12
	11-23	Sandy clay loam, loam, gravelly clay loam.	SC, CL, CL-ML, SM-SC	A-6, A-2-6, A-4, A-2-4	0-3	90-95	70-95	60-90	30-70	20-35	6-15
	23-28	Gravelly sandy clay loam, gravelly loam.	CL, SC, GC, SM-SC	A-6, A-2-6, A-4, A-2-4	0-5	70-90	60-85	55-70	30-60	20-35	6-15
	28-60	Stratified sand to very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	<20	NP
290B2------------ Warsaw	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	80-100	75-100	70-100	50-90	20-30	4-12
	8-27	Sandy clay loam, loam, gravelly clay loam.	SC, CL, CL-ML, SM-SC	A-6, A-2-6, A-4, A-2-4	0-3	90-95	70-95	60-90	30-70	20-35	6-15
	27-30	Gravelly sandy clay loam, gravelly loam.	CL, SC, GC, SM-SC	A-6, A-2-6, A-4, A-2-4	0-5	70-90	60-85	55-70	30-60	20-35	6-15
	30-60	Stratified sand to very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	<20	NP
290C2------------ Warsaw	0-7	Loam-------------	CL, CL-ML	A-4, A-6	0	80-100	75-100	70-100	50-90	20-30	4-12
	7-18	Sandy clay loam, loam, gravelly clay loam.	SC, CL, CL-ML, SM-SC	A-6, A-2-6, A-4, A-2-4	0-3	90-95	70-95	60-90	30-70	20-35	6-15
	18-29	Gravelly sandy clay loam, gravelly loam.	CL, SC, GC, SM-SC	A-6, A-2-6, A-4, A-2-4	0-5	70-90	60-85	55-70	30-60	20-35	6-15
	29-60	Stratified sand to very gravelly sand.	SP, GP, SP-SM, GP-GM	A-1	1-5	30-70	22-55	7-20	2-10	<20	NP
321-------------- Du Page	0-8	Silt loam--------	CL	A-6, A-7	0	95-100	95-100	90-100	70-95	30-45	11-21
	8-52	Sandy loam, loam, gravelly sandy clay loam.	CL	A-4, A-6, A-7	0	85-100	85-100	65-100	55-95	25-45	7-20
	52-60	Stratified loam to gravelly sandy clay loam.	CL-ML, SM-SC, CL, SC	A-4, A-6	0	80-100	80-100	65-100	40-95	10-40	5-20
329-------------- Will	0-11	Loam-------------	CL	A-7, A-6	0	95-100	95-100	90-100	60-90	35-50	15-25
	11-29	Loam, clay loam, silty clay loam.	CL, CH	A-7	0-5	90-100	90-100	80-100	60-90	40-60	20-35
	29-60	Stratified sand to gravelly loamy sand.	GP, GP-GM, SP, SP-SM	A-1	1-10	40-80	40-70	40-50	0-10	---	NP

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
332A, 332B, 332C2------------ Billett	0-7	Fine sandy loam	SM, SM-SC, SC	A-2, A-4	0	100	95-100	85-100	25-50	<25	2-10
	7-23	Sandy loam, fine sandy loam.	SC, SM-SC	A-2, A-4, A-6	0	100	100	85-100	25-50	20-30	5-15
	23-26	Sandy loam, fine sandy loam, loamy sand.	SM, SM-SC, SC	A-2, A-4, A-6	0	95-100	85-100	75-90	20-45	15-30	3-15
	26-60	Loamy sand, gravelly loamy sand, sand.	SM, SW-SM, SM-SC	A-2	0-5	85-100	75-100	20-75	5-30	<25	NP-5
350-------------- Drummer	0-11	Silty clay loam	CL	A-6, A-7	0	100	100	100	80-100	30-50	15-30
	11-41	Silty clay loam	CL	A-6, A-7	0	100	100	100	80-100	30-50	15-30
	41-45	Clay loam, silt loam.	CL	A-6, A-7	0	100	95-100	85-100	50-80	30-50	15-30
	45-60	Sand and gravel	GM, GW-GM, SW-SM, SM	A-1	0-5	40-95	30-85	30-50	5-15	---	NP
351-------------- Elburn	0-10	Silt loam--------	CL	A-6	0	100	100	100	80-100	25-40	10-25
	10-40	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	80-100	30-50	15-30
	40-52	Sandy loam-------	SM-SC, SM	A-2, A-4	0	90-100	80-95	60-80	25-45	<20	NP-5
	52-60	Sand and gravel	GW-GM, GM, SW-SM, SM	A-1	0-5	40-95	30-85	30-50	5-15	---	NP
355A------------- Binghampton	0-8	Sandy loam-------	SC, SM, ML, CL	A-2-4, A-4	0	100	100	60-90	30-55	<20	NP-10
	8-27	Loam, sandy loam, silty clay loam.	CL, CL-ML, SC, SM-SC	A-4, A-6, A-2-4, A-2-6	0	100	100	65-95	30-70	20-40	5-15
	27-51	Coarse sand, sand, loamy sand.	SP-SM, SM	A-2-4, A-3	0	100	100	50-85	5-30	---	NP
	51-66	Clay loam, loam, silty clay loam.	CL	A-6	0	95-100	95-100	70-95	50-90	25-40	15-25
357B------------- Vanpetten	0-12	Loam-------------	CL, CL-ML	A-4, A-6	0	100	95-100	80-100	50-90	20-40	5-20
	12-28	Silt loam, loam, sandy loam.	CL, SC, CL-ML, SM-SC	A-6, A-4, A-2	0	100	100	60-95	30-85	20-40	5-20
	28-50	Coarse sand, loamy coarse sand, loamy sand.	SP-SM, SM	A-2-4, A-3	0	100	100	50-85	5-30	---	NP
	50-60	Clay loam, loam, silty clay loam.	CL	A-6, A-7	0	100	95-100	75-95	50-95	25-50	10-35
361D2------------ Kidder	0-7	Silt loam--------	ML, CL, SM, SC	A-4	0	75-100	70-100	60-100	40-90	20-30	3-10
	7-28	Clay loam, sandy clay loam, loam.	CL, SC	A-6, A-4, A-2	0-5	75-100	70-100	55-95	25-65	25-40	8-15
	28-60	Sandy loam, gravelly sandy loam, fine sandy loam.	SM, GM	A-2, A-4, A-1	3-10	50-90	50-90	30-80	15-45	---	NP
363C2, 363D2----- Griswold	0-7	Loam-------------	CL-ML, CL	A-4, A-6	0	95-100	95-100	90-100	70-90	20-30	5-15
	7-22	Loam, sandy clay loam, clay loam.	CL-ML, CL, SM-SC, SC	A-6, A-4	0-5	95-100	90-100	80-90	45-80	20-35	5-15
	22-34	Sandy loam-------	SC, SM-SC	A-2, A-4, A-6	0-10	85-95	75-90	60-85	30-50	<30	5-15
	34-60	Sandy loam-------	SM, SC, SM-SC	A-2, A-4	0-10	85-95	65-85	50-75	20-45	<25	3-10
369A, 369B2------ Waupecan	0-12	Silt loam--------	CL	A-4, A-6	0	100	100	90-100	85-95	20-35	8-15
	12-35	Silt loam, silty clay loam.	CL	A-6, A-7	0	100	100	95-100	85-95	35-45	15-25
	35-47	Clay loam, gravelly clay loam, loam.	SM, SC, ML, CL	A-2, A-4	0	90-100	65-90	50-70	25-65	<20	NP-10
	47-60	Sand and gravel	GP, SP, SP-SM, GP-GM	A-1	10-35	40-95	30-85	30-50	0-15	---	NP

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
379B2------------ Dakota	0-8	Sandy loam-------	SC, SM-SC, CL, CL-ML	A-4	0	95-100	85-100	75-90	35-55	20-30	4-10
	8-20	Loam, sandy clay loam, clay loam.	CL	A-4, A-6	0	95-100	85-100	80-95	50-80	25-40	9-20
	20-35	Loamy sand, gravelly loamy coarse sand, sandy loam.	SM, SP-SM, GM, GP-GM	A-2, A-4, A-1	0-5	55-100	45-100	40-90	10-40	<21	NP-4
	35-60	Sand, gravelly coarse sand, loamy sand.	SP, SP-SM, GP, GP-GM	A-1, A-3, A-2	0-5	50-100	45-100	30-90	2-5	---	NP
386B------------- Downs	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	8-60	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-45	15-25
411B, 411C2------ Ashdale	0-13	Silt loam--------	CL	A-4, A-6	0	100	100	100	95-100	30-40	8-18
	13-48	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	15-30
	48-52	Silty clay, clay	CH	A-7	0-5	90-100	90-100	90-95	65-90	50-70	30-45
	52	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
429C------------- Palsgrove	0-7	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	23-35	5-14
	7-40	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	36-46	17-27
	40-47	Clay-------------	CH	A-7	0-5	90-95	90-95	80-95	65-90	55-75	30-45
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
440A, 440B, 440C2----------- Jasper	0-15	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-15
	15-45	Sandy clay loam, clay loam, silty clay loam.	SC, CL	A-6	0	100	100	80-95	45-85	20-35	10-20
	45-60	Stratified silt to sand.	SC, CL-ML, CL, SM-SC	A-4	0	100	100	75-90	35-85	<30	5-10
447-------------- Canisteo	0-13	Silt loam--------	CL	A-4, A-6, A-7	0	100	95-100	80-100	55-85	25-45	7-17
	13-54	Clay loam, loam, silt loam.	CL	A-6, A-7	0	95-100	90-100	85-95	65-85	30-45	10-20
	54-60	Loamy sand, sand	SM, SP-SM	A-2, A-3	0	95-100	90-100	50-75	5-25	---	NP
451-------------- Lawson	0-35	Silt loam--------	CL, CL-ML	A-4	0	100	100	90-100	80-100	20-30	5-10
	35-60	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	80-100	20-40	10-25
490A------------- Odell	0-15	Silt loam--------	ML, CL	A-4, A-6	0	100	100	90-100	70-95	30-40	8-14
	15-29	Clay loam, loam, silty clay loam.	CL	A-6, A-7	0	90-100	90-95	80-90	65-75	35-50	17-31
	29-60	Loam, clay loam	CL, ML	A-4, A-6	0-3	85-95	80-90	75-85	50-65	25-40	2-16
501-------------- Morocco	0-16	Loamy fine sand	SM, SM-SC	A-2-4	0	100	100	50-85	15-35	<20	NP-5
	16-60	Fine sand, sand	SM, SP-SM	A-3, A-2-4	0	100	80-100	50-85	5-25	---	NP
503B, 503C2------ Rockton	0-10	Silt loam--------	ML, CL-ML, CL	A-4	0	90-100	90-100	85-95	50-75	25-35	5-10
	10-26	Loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	90-100	90-100	75-90	45-70	30-45	10-20
	26-29	Clay, clay loam, silty clay.	CH, CL	A-7	0-2	90-100	90-100	90-95	70-90	40-60	20-35
	29	Weathered bedrock	---	---	---	---	---	---	---	---	---
504D, 504F------- Sogn	0-12	Loam-------------	CL	A-6	0-10	85-100	85-100	85-100	70-95	25-40	11-23
	12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
506B2------------ Hitt	0-8	Loam-------------	CL	A-6, A-4	0	100	100	100	90-100	25-35	8-18
	8-46	Clay loam, sandy clay loam.	CL	A-7, A-6	0-5	95-100	90-100	85-100	65-90	35-50	11-25
	46-54	Silty clay, clay	CH, CL	A-7	0-10	90-100	90-100	80-95	60-90	40-60	20-35
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
508	0-18	Loam	CL	A-4, A-6	0	100	95-100	80-100	55-85	25-35	7-17
Selma	18-48	Clay loam, loam, sandy loam.	CL, SC	A-6	0	100	95-100	80-95	38-85	20-35	10-20
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
509B, 509D, 509F	0-7	Loam	ML	A-4	0	100	95-100	85-95	60-90	30-40	5-10
Whalan	7-16	Clay loam, loam	CL	A-6	0	95-100	95-100	80-95	70-90	30-40	10-15
	16-23	Clay loam, clay, silty clay.	CL, CH	A-7	0-5	80-100	70-95	65-90	50-85	40-60	20-35
	23	Weathered bedrock	---	---	---	---	---	---	---	---	---
570A, 570B, 570C2, 570D	0-16	Silt loam	CL, CL-ML	A-4, A-6	0	100	90-100	80-100	60-90	22-33	4-12
Martinsville	16-36	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	100	90-100	65-90	40-90	20-35	8-20
	36-54	Sandy loam, sandy clay loam, loam.	SM, ML	A-2-4, A-4	0	100	90-100	60-80	30-60	30-40	2-8
	54-60	Stratified sand to sandy clay loam.	CL, SC, CL-ML, SM-SC	A-4	0	95-100	85-100	80-95	40-60	<25	4-9
627B2, 627C2	0-8	Fine sandy loam	SM, SC, SM-SC	A-4	0	100	95-100	60-85	40-50	<25	3-10
Miami	8-25	Clay loam	CL	A-6, A-7	0-2	90-100	90-95	80-95	60-76	30-45	10-20
	25-60	Loam	CL, CL-ML	A-4, A-6	0-2	90-100	90-95	76-90	55-75	20-30	5-15
648	0-17	Clay loam	OL, MH, ML, OH	A-7	0-5	95-100	95-100	80-90	55-75	45-60	15-25
Clyde	17-32	Clay loam, loam, silty clay loam.	CL, ML	A-6, A-7	0-5	95-100	90-95	75-90	50-75	30-50	10-20
	32-36	Sandy loam, loam	SM, SM-SC	A-2	2-5	80-95	75-90	50-80	15-35	15-20	NP-5
	36-60	Loam	CL, SC	A-6	2-5	90-95	85-90	75-90	45-65	25-35	10-20
649	0-11	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	85-100	60-90	25-40	5-15
Nachusa	11-23	Silty clay loam, silt loam, loam.	CL, CL-ML	A-6, A-4, A-7	0	100	95-100	80-100	55-95	25-45	5-20
	23-46	Clay loam, loam, clay.	CL	A-7, A-6	0	95-100	95-100	80-100	55-80	35-50	15-25
	46-60	Loam, clay loam	CL, CL-ML, SC, SM-SC	A-4, A-6, A-7	0-5	95-100	85-100	60-95	45-65	20-45	5-25
650B	0-12	Silt loam	CL, CL-ML	A-6, A-4	0	100	100	85-100	60-90	25-40	5-15
Prairieville	12-26	Silt loam, loam, silty clay loam.	CL, CL-ML	A-6, A-4, A-7	0	100	95-100	80-100	55-95	25-45	5-20
	26-41	Clay loam	CL	A-7, A-6	0	95-100	95-100	80-100	55-75	35-50	15-25
	41-60	Clay loam, loam	CL, CL-ML	A-4, A-6, A-7	0-5	95-100	85-100	60-95	50-65	20-45	5-25
727A	0-11	Silt loam	CL	A-6	0	100	90-100	70-90	50-75	30-40	10-20
Waukee	11-32	Loam, sandy clay loam.	CL, SM-SC, SC, CL-ML	A-6, A-4	0-5	85-95	80-95	65-85	40-60	20-35	5-15
	32-60	Gravelly sand, loamy coarse sand, sand.	SW, SM, SP-SM, SP	A-1	2-10	60-90	60-85	20-40	3-25	---	NP
741D3	0-3	Fine sand	SM, SP, SP-SM	A-2, A-3	0	100	100	50-85	0-35	---	NP
Oakville	3-60	Fine sand, sand, loamy fine sand.	SM, SP, SP-SM	A-2, A-3	0	100	95-100	65-95	0-25	---	NP
742B2, 742C2	0-9	Sandy loam	SM, SC, SM-SC	A-2, A-4	0	100	100	80-95	30-50	15-30	NP-10
Dickinson	9-54	Fine sandy loam, sandy loam, loamy sand.	SM, SP, SM-SC	A-2, A-3	0	100	100	80-95	3-20	10-20	NP-5
	54-60	Loam	CL	A-6	2-5	90-95	85-95	80-90	55-65	25-35	11-20

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
761D, 761F: Eleva	0-8	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	0	95-100	80-100	50-90	25-55	<25	2-7
	8-32	Loam, sandy loam, fine sandy loam.	ML, CL, SM, SC	A-2, A-4	0	95-100	80-100	50-95	25-75	20-28	4-9
	32	Weathered bedrock	---	---	---	---	---	---	---	---	---
776: Comfrey	0-24	Loam	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-95	60-90	20-32	5-12
	24-34	Loam, clay loam	CL	A-4, A-6	0	95-100	90-100	75-95	55-80	24-40	8-15
	34-50	Loam, clay loam	CL	A-4, A-6	0	90-100	85-95	70-90	50-75	24-34	8-13
	50-60	Gravelly sand, sand, loamy sand.	SP, SP-SM, SM	A-1, A-2, A-3	0-5	50-95	50-90	25-60	3-20	<20	NP-4
777: Adrian	0-34	Sapric material	PT	A-8	---	---	---	---	---	---	---
	34-60	Sand, loamy sand, fine sand.	SP, SM	A-2, A-3, A-1	0	80-100	60-100	35-75	0-30	---	NP
779B, 779D, 779F: Chelsea	0-3	Fine sand	SM, SP-SM	A-2-4	0	100	100	65-100	10-35	---	NP
	3-60	Fine sand, sand, loamy sand.	SP, SM, SP-SM	A-3, A-2-4	0	100	100	65-100	3-15	---	NP
781B: Friesland	0-14	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4, A-2	0	100	100	60-85	30-55	<25	1-7
	14-34	Loam, fine sandy loam, sandy clay loam.	SC, CL	A-4, A-6	0	100	100	70-95	40-75	25-40	9-18
	34-60	Silt loam, loam, sandy loam.	SM, ML, SC, CL	A-4, A-1, A-2, A-6	0-10	65-100	60-100	35-100	20-90	<30	1-11
802A*. Orthents											
864*, 865*. Pits											
3067: Harpster	0-14	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	90-100	45-60	20-35
	14-41	Silty clay loam	CL, CH	A-7	0	100	95-100	95-100	85-100	40-60	20-35
	41-60	Silty clay loam, silt loam, loam.	CL, CH	A-6, A-7	0	100	95-100	95-100	70-100	35-55	20-35
4200: Orio	0-11	Sandy loam	SM, SC, SM-SC	A-4, A-2-4	0	100	100	70-85	25-50	15-30	2-10
	11-21	Loam, sandy loam, loamy sand.	SM, SC, ML, CL	A-4, A-2-4	0	100	100	75-90	15-60	<35	2-10
	21-37	Sandy loam, sandy clay loam, clay loam.	CL, SC	A-6, A-7	0	100	100	80-95	35-75	30-45	10-20
	37-60	Loamy sand, sand, loamy fine sand.	SM, SC, SP-SM, SM-SC	A-2-4, A-3	0	100	100	60-90	5-35	20-30	NP-10
4776: Comfrey	0-11	Silt loam	ML, OL, CL	A-6, A-4	0	100	100	85-100	55-90	30-40	5-15
	11-28	Clay loam, loam	OL, OH, MH, ML	A-7	0	100	100	85-100	65-85	45-60	12-25
	28-60	Clay loam, loam	CL	A-7, A-6	0	100	100	80-100	60-85	35-50	12-25
6206: Thorp Variant	0-16	Silt loam	ML, CL, CL-ML	A-4	0	100	100	85-100	60-90	<25	NP-10
	16-34	Clay loam, loam, sandy loam.	CL, SC	A-6	0	98-100	95-100	80-95	35-85	24-36	11-19
	34-60	Clay loam	CL	A-7, A-6	0-5	95-100	85-100	60-95	55-75	20-45	5-25
6397D, 6397F: Boone Variant	0-6	Loamy fine sand	SM	A-2, A-4	0	100	100	50-90	15-50	---	NP
	6-18	Loamy fine sand, fine sand.	SM, SP-SM	A-2, A-3	0	100	100	50-75	5-30	---	NP
	18	Weathered bedrock	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	G/cm^3	In/hr	In/in	pH					Pct
27B, 27C2--------	0-6	20-27	1.30-1.45	0.6-2.0	0.19-0.21	5.6-7.3	Moderate-----	0.37	5	5	.5-2
Miami	6-26	27-35	1.45-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.37			
	26-60	15-26	1.45-1.60	0.6-2.0	0.17-0.19	7.4-8.4	Low----------	0.37			
27D3-------------	0-7	27-35	1.35-1.50	0.6-2.0	0.17-0.19	5.6-7.3	Moderate-----	0.37	5	6	.5-1
Miami	7-24	27-35	1.45-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.37			
	24-60	15-26	1.45-1.60	0.6-2.0	0.17-0.19	7.4-8.4	Low----------	0.37			
27E--------------	0-6	20-27	1.30-1.45	0.6-2.0	0.19-0.21	5.6-7.3	Moderate-----	0.37	5	5	.5-2
Miami	6-30	27-35	1.45-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.37			
	30-60	15-26	1.45-1.60	0.6-2.0	0.17-0.19	7.4-8.4	Low----------	0.37			
36A, 36B, 36C2---	0-13	20-29	1.25-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.32	5	7	3-4
Tama	13-51	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.43			
	51-60	20-30	1.35-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
41A--------------	0-17	24-27	1.28-1.32	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	5-6
Muscatine	17-40	30-35	1.28-1.35	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	40-60	22-30	1.35-1.40	0.6-2.0	0.18-0.20	6.6-7.8	Moderate-----	0.43			
45---------------	0-14	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	3	6	3-4
Denny	14-39	35-45	1.20-1.40	0.06-0.2	0.11-0.22	5.6-6.5	High---------	0.37			
	39-60	25-35	1.40-1.60	0.2-0.6	0.20-0.22	5.6-7.8	Low----------	0.37			
60B2, 60C2-------	0-7	18-25	1.10-1.35	0.6-2.0	0.20-0.24	6.1-7.3	Low----------	0.32	5-4	5	2-4
La Rose	7-19	25-35	1.35-1.55	0.6-2.0	0.15-0.20	5.6-7.8	Moderate-----	0.32			
	19-60	20-30	1.50-1.70	0.6-2.0	0.09-0.11	7.4-8.4	Low----------	0.32			
64B, 64C2--------	0-11	10-18	1.35-1.50	0.6-2.0	0.16-0.18	5.6-7.3	Low----------	0.20	5	3	3-5
Parr	11-29	20-30	1.40-1.55	0.6-2.0	0.15-0.19	5.6-6.5	Moderate-----	0.32			
	29-60	8-20	1.40-1.60	0.6-2.0	0.05-0.19	7.4-8.4	Low----------	0.32			
67---------------	0-13	22-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate-----	0.28	5	4L	5-6
Harpster	13-35	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate-----	0.28			
	35-60	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate-----	0.28			
68---------------	0-12	27-35	1.15-1.35	0.6-2.0	0.21-0.23	5.6-7.3	Moderate-----	0.28	5	6	5-6
Sable	12-51	24-35	1.30-1.50	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.28			
	51-60	20-27	1.30-1.50	0.2-2.0	0.20-0.22	6.6-7.8	Low----------	0.28			
68+--------------	0-14	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.28	5	6	2-4
Sable	14-51	24-35	1.30-1.50	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.28			
	51-60	20-27	1.30-1.50	0.2-2.0	0.20-0.22	6.6-7.8	Low----------	0.28			
69---------------	0-23	35-42	1.30-1.50	0.6-2.0	0.12-0.23	5.6-7.3	High---------	0.28	5	4	5-6
Milford	23-49	35-42	1.45-1.65	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.43			
	49-60	20-30	1.50-1.70	0.2-0.6	0.10-0.13	6.6-8.4	Moderate-----	0.43			
73---------------	0-23	15-27	1.20-1.45	0.6-2.0	0.19-0.24	6.1-7.8	Low----------	0.32	5	5	3-5
Ross	23-55	18-32	1.20-1.50	0.6-2.0	0.16-0.22	6.1-8.4	Low----------	0.32			
	55-60	5-25	1.35-1.60	0.6-6.0	0.05-0.18	6.1-8.4	Low----------	0.32			
76---------------	0-30	18-27	1.10-1.25	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.28	5	6	2-4
Otter	30-60	15-28	1.30-1.55	0.6-2.0	0.15-0.20	6.1-8.4	Low----------	0.43			
82---------------	0-12	27-35	1.40-1.60	0.6-2.0	0.17-0.23	7.4-8.4	Moderate-----	0.28	5	6	4-6
Millington	12-46	18-35	1.40-1.60	0.6-2.0	0.17-0.20	7.4-8.4	Moderate-----	0.28			
	46-60	18-35	1.50-1.70	0.6-2.0	0.14-0.20	7.4-8.4	Moderate-----	0.28			
87A, 87B---------	0-17	10-18	1.50-1.55	2.0-6.0	0.12-0.15	5.6-7.3	Low----------	0.20	4	3	1-2
Dickinson	17-29	10-15	1.45-1.55	2.0-6.0	0.12-0.15	5.1-6.5	Low----------	0.20			
	29-48	4-10	1.55-1.65	6.0-20	0.08-0.10	5.1-6.5	Low----------	0.20			
	48-60	4-10	1.60-1.70	6.0-20	0.02-0.04	5.6-6.5	Low----------	0.15			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH					Pct
88B2, 88D2	0-8	3-10	1.20-1.40	2.0-6.0	0.09-0.12	5.1-7.3	Low	0.17	5	2	1-2
Sparta	8-34	1-8	1.40-1.60	6.0-20	0.05-0.11	5.1-6.5	Low	0.17			
	34-60	0-5	1.50-1.70	6.0-20	0.04-0.07	5.1-6.0	Low	0.17			
93E	0-7	5-20	1.10-1.40	2.0-6.0	0.09-0.12	6.6-7.8	Low	0.15	3	8	2-4
Rodman	7-15	5-25	1.10-1.50	2.0-6.0	0.09-0.12	6.6-7.8	Low	0.20			
	15-60	0-10	>1.80	>20	0.02-0.04	7.4-8.4	Low	0.10			
102	0-23	10-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.3	Low	0.28	5	5	3-4
La Hogue	23-38	18-35	1.50-1.70	0.6-2.0	0.12-0.20	5.1-7.3	Moderate	0.28			
	38-60	5-20	1.60-1.80	0.6-6.0	0.05-0.22	5.6-7.8	Low	0.20			
103	0-60	---	0.15-0.45	0.2-6.0	0.35-0.45	5.6-7.8	-------	----	---	3	>70
Houghton											
125	0-18	20-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.8	Low	0.28	5	6	4-6
Selma	18-53	20-30	1.40-1.60	0.6-2.0	0.15-0.20	6.1-8.4	Moderate	0.28			
	53-60	3-15	1.60-1.90	2.0-6.0	0.05-0.13	6.6-8.4	Low	0.28			
145B2, 145C2	0-8	20-26	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low	0.32	5	6	3-4
Saybrook	8-29	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.43			
	29-60	24-35	1.50-1.70	0.6-2.0	0.15-0.21	5.6-8.4	Low	0.43			
152	0-16	27-35	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.8	Moderate	0.28	5	7	5-7
Drummer	16-46	27-35	1.20-1.45	0.6-2.0	0.21-0.24	5.6-7.8	Moderate	0.28			
	46-60	22-33	1.30-1.55	0.6-2.0	0.17-0.20	6.1-8.4	Moderate	0.28			
154A	0-14	20-30	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Moderate	0.28	5	6	4-5
Flanagan	14-41	35-42	1.25-1.45	0.6-2.0	0.15-0.22	5.6-7.3	High	0.43			
	41-60	20-30	1.45-1.70	0.2-0.6	0.15-0.22	6.1-8.4	Low	0.43			
171B, 171C2	0-11	18-27	1.15-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low	0.32	5	6	3-4
Catlin	11-31	27-35	1.25-1.55	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.43			
	31-60	20-30	1.40-1.70	0.6-2.0	0.07-0.11	6.1-8.4	Low	0.43			
172	0-32	8-18	1.35-1.70	2.0-6.0	0.12-0.15	5.1-6.5	Low	0.20	4	3	2-3
Hoopeston	32-60	2-10	1.50-1.80	6.0-20	0.05-0.10	4.5-8.4	Low	0.17			
198	0-15	22-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low	0.28	5	6	4-5
Elburn	15-51	27-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.8	Moderate	0.43			
	51-60	15-25	1.50-1.70	0.6-6.0	0.12-0.18	6.1-8.4	Low	0.43			
199A, 199B	0-10	18-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low	0.32	5	6	3-5
Plano	10-56	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.1-7.3	Moderate	0.43			
	56-60	10-20	1.50-1.70	0.6-2.0	0.11-0.22	6.6-8.4	Low	0.43			
199C2	0-10	18-27	1.10-1.30	0.6-2.0	0.22-0.24	6.1-7.3	Low	0.32	5-4	6	3-5
Plano	10-56	25-35	1.20-1.40	0.6-2.0	0.18-0.20	5.6-7.3	Moderate	0.43			
	56-60	10-20	1.50-1.70	0.6-2.0	0.11-0.22	6.6-8.4	Low	0.43			
200	0-11	8-18	1.30-1.50	2.0-6.0	0.13-0.15	4.5-7.8	Low	0.20	5	3	1-2
Orio	11-21	6-20	1.30-1.50	0.6-2.0	0.09-0.18	4.5-7.8	Low	0.28			
	21-37	18-30	1.40-1.60	0.2-0.6	0.12-0.19	4.5-7.8	Moderate	0.28			
	37-60	3-10	1.55-1.75	6.0-20	0.05-0.13	4.5-7.8	Low	0.28			
201	0-23	10-20	1.50-1.70	2.0-6.0	0.16-0.18	5.6-7.3	Low	0.20	4	3	2-4
Gilford	23-40	8-17	1.60-1.80	2.0-6.0	0.12-0.14	5.6-7.3	Low	0.20			
	40-60	3-12	1.70-1.90	6.0-20	0.05-0.08	6.6-8.4	Low	0.15			
204B2	0-8	2-8	1.20-1.35	6.0-20	0.07-0.09	4.5-7.3	Low	0.15	5	1	1-2
Ayr	8-27	2-10	1.20-1.40	6.0-20	0.06-0.11	5.1-6.0	Low	0.17			
	27-39	17-27	1.50-1.70	0.6-2.0	0.17-0.19	5.6-7.8	Low	0.37			
	39-60	10-18	1.50-1.70	0.6-2.0	0.17-0.19	7.4-8.4	Low	0.37			
221B, 221B2, 221C2	0-12	12-22	1.30-1.45	0.6-2.0	0.21-0.24	5.6-7.3	Low	0.32	5	5	3-5
Parr	12-38	20-30	1.40-1.55	0.6-2.0	0.15-0.19	5.6-6.5	Moderate	0.32			
	38-60	8-20	1.40-1.60	0.6-2.0	0.05-0.19	7.4-8.4	Low	0.32			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH					Pct
233B, 233C2------ Birkbeck	0-9	20-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-6.5	Low-----------	0.37	5	6	1-3
	9-40	25-35	1.30-1.50	0.6-2.0	0.18-0.22	5.1-6.5	Moderate------	0.37			
	40-60	20-30	1.40-1.60	0.6-2.0	0.14-0.20	5.6-7.8	Low-----------	0.37			
243A, 243B-------- St. Charles	0-8	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-6.5	Low-----------	0.37	5-4	6	1-3
	8-41	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.1-7.3	Moderate------	0.37			
	41-60	10-25	1.55-1.75	0.6-2.0	0.11-0.22	5.6-7.8	Low-----------	0.37			
244--------------- Hartsburg	0-16	22-35	1.05-1.25	0.6-2.0	0.21-0.23	6.1-7.3	Moderate------	0.28	5	4	3-5
	16-33	25-35	1.20-1.50	0.6-2.0	0.18-0.22	6.6-8.4	Moderate------	0.43			
	33-60	22-27	1.30-1.55	0.6-2.0	0.20-0.22	7.4-8.4	Low-----------	0.43			
259C2------------- Assumption	0-7	20-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-6.5	Low-----------	0.32	4-3	6	3-4
	7-31	25-35	1.20-1.40	0.6-2.0	0.18-0.22	5.1-6.5	Moderate------	0.43			
	31-60	30-45	1.40-1.65	0.2-0.6	0.14-0.20	5.1-6.5	Moderate------	0.43			
280B, 280C2, 280D------------- Fayette	0-6	15-25	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low-----------	0.37	5	6	1-2
	6-45	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate------	0.37			
	45-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate------	0.37			
290A-------------- Warsaw	0-11	15-25	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.28	4-3	5	2-5
	11-23	17-30	1.35-1.60	0.6-2.0	0.16-0.19	5.1-6.5	Low-----------	0.28			
	23-28	17-30	1.40-1.65	0.6-2.0	0.15-0.17	6.6-8.4	Low-----------	0.28			
	28-60	2-8	1.40-1.65	>20	0.02-0.04	7.9-8.4	Low-----------	0.10			
290B2------------- Warsaw	0-8	15-25	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.28	4-3	5	2-5
	8-27	17-30	1.35-1.60	0.6-2.0	0.16-0.19	5.1-6.5	Low-----------	0.28			
	27-30	17-30	1.40-1.65	0.6-2.0	0.15-0.17	6.6-8.4	Low-----------	0.28			
	30-60	2-8	1.40-1.65	>20	0.02-0.04	7.9-8.4	Low-----------	0.10			
290C2------------- Warsaw	0-7	15-25	1.30-1.50	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.28	4-3	5	2-5
	7-18	17-30	1.35-1.60	0.6-2.0	0.16-0.19	5.1-6.5	Low-----------	0.28			
	18-29	17-30	1.40-1.65	0.6-2.0	0.15-0.17	6.6-8.4	Low-----------	0.28			
	29-60	2-8	1.40-1.65	>20	0.02-0.04	7.9-8.4	Low-----------	0.10			
321--------------- Du Page	0-8	18-27	1.40-1.60	0.6-2.0	0.22-0.24	6.6-8.4	Moderate------	0.28	5	6	3-5
	8-52	18-27	1.45-1.65	0.6-2.0	0.10-0.20	7.4-8.4	Low-----------	0.28			
	52-60	6-20	1.50-1.70	0.6-6.0	0.08-0.20	7.9-8.4	Low-----------	0.28			
329--------------- Will	0-11	20-27	1.25-1.40	0.6-2.0	0.15-0.20	6.1-8.4	Moderate------	0.28	4	6	5-6
	11-29	23-33	1.35-1.55	0.6-2.0	0.15-0.20	6.1-7.3	Moderate------	0.28			
	29-60	3-10	1.65-1.85	6.0-20	0.02-0.04	7.9-8.4	Low-----------	0.10			
332A, 332B, 332C2------------ Billett	0-7	7-15	1.40-1.70	2.0-6.0	0.13-0.18	5.6-7.3	Low-----------	0.20	5	3	1-2
	7-23	10-18	1.40-1.70	2.0-6.0	0.10-0.15	5.1-6.5	Low-----------	0.20			
	23-26	8-18	1.50-1.80	2.0-6.0	0.05-0.12	5.6-7.3	Low-----------	0.20			
	26-60	2-7	1.60-1.90	6.0-20	0.02-0.10	5.1-7.8	Low-----------	0.10			
350--------------- Drummer	0-11	27-35	1.10-1.30	0.6-2.0	0.21-0.23	5.6-7.3	Moderate------	0.28	5	7	5-7
	11-41	27-35	1.20-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate------	0.28			
	41-45	22-33	1.30-1.55	0.6-2.0	0.15-0.19	5.6-7.3	Moderate------	0.28			
	45-60	1-8	1.80-2.10	>20	0.02-0.04	6.6-8.4	Low-----------	0.10			
351--------------- Elburn	0-10	20-27	1.10-1.30	0.6-2.0	0.22-0.24	5.6-7.3	Low-----------	0.28	5	6	2-4
	10-40	25-35	1.20-1.40	0.6-2.0	0.18-0.22	5.6-7.3	Moderate------	0.43			
	40-52	5-15	1.60-1.75	2.0-6.0	0.11-0.13	5.6-7.3	Low-----------	0.24			
	52-60	2-8	1.80-2.10	>20.0	0.02-0.04	6.6-8.4	Low-----------	0.10			
355A-------------- Binghampton	0-8	8-18	1.35-1.55	0.6-2.0	0.13-0.15	5.6-7.3	Low-----------	0.20	4	3	1-3
	8-27	15-30	1.40-1.60	0.6-2.0	0.12-0.21	4.5-6.0	Moderate------	0.43			
	27-51	3-12	1.70-1.90	>20	0.03-0.11	4.5-6.5	Low-----------	0.15			
	51-66	25-40	1.70-1.90	0.2-0.6	0.14-0.19	4.5-7.3	Moderate------	0.43			
357B-------------- Vanpetten	0-12	12-20	1.35-1.55	0.6-2.0	0.20-0.24	5.6-7.3	Low-----------	0.24	4	6	2-4
	12-28	18-27	1.40-1.60	0.6-2.0	0.12-0.22	4.5-6.0	Moderate------	0.32			
	28-50	3-12	1.70-1.90	>20	0.06-0.11	3.6-6.5	Low-----------	0.15			
	50-60	25-40	1.70-1.90	0.2-0.6	0.14-0.19	4.5-7.3	Moderate------	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH					Pct
361D2------------ Kidder	0-7	10-17	1.35-1.55	0.6-2.0	0.20-0.24	6.1-7.8	Low----------	0.32	5	5	1-3
	7-28	18-30	1.55-1.65	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.32			
	28-60	6-15	1.35-1.85	2.0-6.0	0.09-0.11	7.4-8.4	Low----------	0.32			
363C2, 363D2----- Griswold	0-7	15-25	1.10-1.30	0.6-2.0	0.16-0.22	5.6-7.8	Low----------	0.32	5	5	2-4
	7-22	25-32	1.20-1.40	0.6-2.0	0.14-0.19	5.6-7.8	Low----------	0.32			
	22-34	18-28	1.40-1.60	0.6-2.0	0.12-0.14	5.6-7.8	Low----------	0.32			
	34-60	15-20	1.45-1.65	0.6-2.0	0.11-0.13	7.4-8.4	Low----------	0.32			
369A, 369B2------ Waupecan	0-12	15-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.32	4	6	4-5
	12-35	25-35	1.30-1.50	0.6-2.0	0.18-0.22	5.1-6.5	Moderate-----	0.43			
	35-47	10-25	1.55-1.75	2.0-6.0	0.08-0.18	5.6-7.8	Low----------	0.10			
	47-60	3-10	1.60-1.80	>20.0	0.02-0.04	7.4-8.4	Low----------	0.10			
379B2------------ Dakota	0-8	9-20	1.45-1.55	0.6-2.0	0.12-0.18	5.1-7.3	Low----------	0.20	4	3	2-4
	8-20	18-32	1.30-1.55	0.6-2.0	0.15-0.19	5.1-7.3	Low----------	0.28			
	20-35	4-11	1.55-1.65	2.0-6.0	0.05-0.14	5.1-7.3	Low----------	0.17			
	35-60	1-4	1.55-1.65	6.0-20	0.02-0.04	5.1-7.8	Low----------	0.17			
386B------------- Downs	0-8	15-25	1.25-1.30	2.0-6.0	0.21-0.23	5.1-7.3	Low----------	0.32	5	6	2-3
	8-60	27-35	1.30-1.35	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
411B, 411C2------ Ashdale	0-13	20-27	1.15-1.35	0.6-2.0	0.22-0.24	6.1-7.3	Low----------	0.32	5	6	3-5
	13-48	27-35	1.35-1.60	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.43			
	48-52	55-75	1.25-1.45	0.06-0.6	0.09-0.13	5.6-7.3	High---------	0.32			
	52	---	---	---	---	---	-------------	----			
429C------------- Palsgrove	0-7	21-27	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	1-2
	7-40	25-35	1.40-1.60	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.43			
	40-47	55-75	1.20-1.40	0.06-0.2	0.08-0.10	5.6-7.3	High---------	0.32			
	47	---	---	---	---	---	-------------	----			
440A, 440B, 440C2----------- Jasper	0-15	10-22	1.30-1.45	0.6-2.0	0.20-0.24	5.1-6.5	Low----------	0.28	5	5	3-5
	15-45	20-32	1.40-1.60	0.6-2.0	0.16-0.18	5.1-6.0	Low----------	0.28			
	45-60	5-20	1.50-1.70	0.6-2.0	0.19-0.21	7.4-7.8	Low----------	0.28			
447-------------- Canisteo	0-13	20-27	1.40-1.60	0.6-2.0	0.20-0.24	7.4-8.4	Moderate-----	0.28	5	4L	4-8
	13-54	25-35	1.35-1.50	0.6-2.0	0.15-0.19	7.4-8.4	Moderate-----	0.28			
	54-60	2-12	1.65-1.80	6.0-20	0.05-0.10	7.4-8.4	Low----------	0.17			
451-------------- Lawson	0-35	10-20	1.20-1.55	0.6-2.0	0.22-0.24	6.1-7.8	Low----------	0.32	5	5	3-5
	35-60	18-30	1.55-1.65	0.6-2.0	0.18-0.20	6.1-7.8	Moderate-----	0.43			
490A------------- Odell	0-15	20-27	1.30-1.50	0.6-2.0	0.21-0.24	5.6-7.3	Low----------	0.28	5	5	3-5
	15-29	25-35	1.50-1.70	0.2-0.6	0.15-0.19	5.6-6.5	Moderate-----	0.37			
	29-60	18-30	1.50-1.70	0.2-0.6	0.05-0.19	6.6-8.4	Low----------	0.37			
501-------------- Morocco	0-16	1-6	1.40-1.60	6.0-20	0.10-0.12	5.1-6.5	Low----------	0.17	5	2	.5-2
	16-60	1-6	1.50-1.70	6.0-20	0.05-0.07	4.5-6.0	Low----------	0.17			
503B, 503C2------ Rockton	0-10	18-28	1.30-1.40	0.6-2.0	0.20-0.22	5.1-6.5	Low----------	0.28	4	6	2-6
	10-26	25-35	1.40-1.55	0.6-2.0	0.17-0.19	5.1-6.5	Moderate-----	0.28			
	26-29	35-60	1.35-1.45	0.6-2.0	0.10-0.14	5.6-7.3	High---------	0.28			
	29	---	---	---	---	---	-------------	----			
504D, 504F------- Sogn	0-12	18-25	1.15-1.20	0.6-2.0	0.17-0.22	6.1-8.4	Moderate-----	0.32	1	4L	2-3
	12	---	---	---	---	---	-------------	----			
506B2------------ Hitt	0-8	22-27	1.15-1.35	0.6-2.0	0.22-0.24	5.1-6.5	Low----------	0.32	5	6	3-5
	8-46	27-37	1.40-1.60	0.6-2.0	0.15-0.19	5.1-6.0	Moderate-----	0.32			
	46-54	55-70	1.30-1.60	0.06-0.2	0.08-0.12	5.6-7.3	Moderate-----	0.32			
	54	---	---	---	---	---	-------------	----			
508-------------- Selma	0-18	20-27	1.40-1.60	0.6-2.0	0.20-0.24	6.1-7.8	Low----------	0.28	5	6	4-6
	18-48	18-30	1.40-1.60	0.6-2.0	0.15-0.19	6.1-8.4	Moderate-----	0.28			
	48	---	---	---	---	---	-------------	----			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	G/cm^3	In/hr	In/in	pH					Pct
509B, 509D, 509F--	0-7	18-25	1.30-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	4	6	1-2
Whalan	7-16	18-35	1.40-1.55	0.6-2.0	0.17-0.19	5.1-6.5	Low----------	0.32			
	16-23	35-60	1.35-1.45	0.06-0.2	0.15-0.19	5.6-7.8	High---------	0.32			
	23	---	---	---	---	---	------------	----			
570A, 570B, 570C2, 570D-----	0-16	8-17	1.30-1.45	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
Martinsville	16-36	18-30	1.40-1.60	0.6-2.0	0.17-0.20	5.1-6.0	Moderate-----	0.37			
	36-54	10-25	1.40-1.60	0.6-2.0	0.12-0.14	5.6-6.5	Low----------	0.24			
	54-60	3-23	1.50-1.70	0.6-2.0	0.19-0.21	7.4-8.4	Low----------	0.24			
627B2, 627C2-----	0-8	8-20	1.35-1.50	0.6-2.0	0.16-0.18	5.6-7.3	Low----------	0.24	5	3	.5-2
Miami	8-25	27-35	1.45-1.60	0.6-2.0	0.15-0.19	5.6-7.8	Moderate-----	0.37			
	25-60	15-26	1.45-1.60	0.6-2.0	0.17-0.19	7.4-8.4	Low----------	0.37			
648--------------	0-17	28-32	1.35-1.40	0.6-2.0	0.21-0.23	6.1-7.3	Moderate-----	0.28	5	7	9-11
Clyde	17-32	22-28	1.45-1.65	0.6-2.0	0.18-0.20	6.1-7.3	Moderate-----	0.37			
	32-36	10-15	1.60-1.70	2.0-6.0	0.11-0.13	6.1-7.3	Low----------	0.37			
	36-60	20-24	1.70-1.80	0.6-2.0	0.17-0.19	6.6-8.4	Moderate-----	0.37			
649--------------	0-11	15-27	1.15-1.35	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	5	6	4-6
Nachusa	11-23	15-33	1.20-1.40	0.6-2.0	0.17-0.22	4.5-7.3	Moderate-----	0.32			
	23-46	25-35	1.35-1.55	0.2-0.6	0.09-0.20	5.1-7.3	Moderate-----	0.43			
	46-60	12-32	1.35-1.60	0.2-2.0	0.14-0.19	6.1-8.4	Moderate-----	0.43			
650B-------------	0-12	15-25	1.15-1.35	0.6-2.0	0.20-0.24	5.6-7.3	Low----------	0.32	5	6	3-4
Prairieville	12-26	15-33	1.20-1.40	0.6-2.0	0.17-0.22	4.5-6.5	Moderate-----	0.32			
	26-41	30-35	1.35-1.55	0.2-0.6	0.09-0.20	5.1-7.3	Moderate-----	0.43			
	41-60	12-32	1.35-1.60	0.2-2.0	0.14-0.19	6.1-7.3	Moderate-----	0.43			
727A-------------	0-11	18-24	1.40-1.45	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.24	4	6	3-4
Waukee	11-32	18-27	1.40-1.50	0.6-2.0	0.15-0.19	5.1-6.0	Low----------	0.24			
	32-60	2-8	1.50-1.75	>20	0.02-0.06	5.6-6.5	Low----------	0.10			
741D3------------	0-3	0-10	1.30-1.55	6.0-20	0.07-0.09	5.6-7.3	Low----------	0.15	5	1	.5-2
Oakville	3-60	0-10	1.30-1.65	6.0-20	0.06-0.10	5.6-7.3	Low----------	0.15			
742B2, 742C2-----	0-9	12-18	1.50-1.55	2.0-6.0	0.12-0.15	5.6-7.3	Low----------	0.20	4	3	1-2
Dickinson	9-54	5-15	1.45-1.55	6.0-20	0.08-0.10	5.1-6.0	Low----------	0.20			
	54-60	20-24	1.55-1.80	0.6-2.0	0.17-0.19	5.6-6.5	Low----------	0.37			
761D, 761F-------	0-8	5-15	1.40-1.70	2.0-6.0	0.12-0.18	5.1-7.3	Low----------	0.24	4	3	1-3
Eleva	8-32	10-18	1.50-1.70	2.0-6.0	0.10-0.19	5.1-6.5	Low----------	0.24			
	32	---	---	---	---	---	------------	----			
776--------------	0-24	12-27	1.20-1.40	0.6-2.0	0.20-0.24	6.6-7.8	Low----------	0.28	5	6	6-10
Comfrey	24-34	18-35	1.20-1.40	0.6-2.0	0.17-0.22	6.6-7.8	Moderate-----	0.28			
	34-50	18-30	1.30-1.50	0.6-2.0	0.19-0.21	6.6-7.8	Moderate-----	0.28			
	50-60	2-6	1.50-1.75	>20	0.02-0.08	7.4-8.4	Low----------	0.10			
777--------------	0-34	---	0.30-0.55	0.2-6.0	0.35-0.45	5.1-7.8	------------	----	---	3	55-75
Adrian	34-60	2-10	1.40-1.75	6.0-20	0.03-0.08	5.6-8.4	Low----------	----			
779B, 779D, 779F-	0-3	8-15	1.50-1.55	6.0-20	0.10-0.15	5.6-7.3	Low----------	0.17	5	2	.5-1
Chelsea	3-60	5-10	1.55-1.70	6.0-20	0.06-0.08	5.1-5.5	Low----------	0.17			
781B-------------	0-14	5-15	1.40-1.70	0.6-2.0	0.13-0.18	5.6-6.5	Low----------	0.24	5	3	3-5
Friesland	14-34	18-30	1.35-1.55	0.6-2.0	0.12-0.19	5.6-6.5	Low----------	0.32			
	34-60	5-20	1.35-1.85	0.6-2.0	0.08-0.22	6.1-8.4	Low----------	0.32			
802A*. Orthents											
864*, 865*. Pits											

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH					Pct
3067------------- Harpster	0-14	22-35	1.05-1.25	0.6-2.0	0.21-0.24	7.4-8.4	Moderate-----	0.28	5	4L	5-6
	14-41	27-35	1.20-1.50	0.6-2.0	0.18-0.22	7.4-8.4	Moderate-----	0.43			
	41-60	22-35	1.25-1.55	0.6-2.0	0.17-0.22	7.4-8.4	Moderate-----	0.43			
4200------------- Orio	0-11	8-18	1.30-1.50	2.0-6.0	0.13-0.15	4.5-7.8	Low----------	0.20	5	3	1-2
	11-21	6-20	1.30-1.50	0.6-2.0	0.09-0.18	4.5-7.8	Low----------	0.28			
	21-37	18-30	1.40-1.60	0.2-0.6	0.12-0.19	4.5-7.8	Moderate-----	0.28			
	37-60	3-10	1.55-1.75	6.0-20	0.05-0.13	4.5-7.8	Low----------	0.28			
4776------------- Comfrey	0-11	18-27	1.20-1.40	0.6-2.0	0.20-0.24	6.6-7.8	Low----------	0.28	5	6	6-10
	11-28	18-35	1.20-1.40	0.6-2.0	0.16-0.20	6.6-7.8	Moderate-----	0.28			
	28-60	18-35	1.30-1.50	0.6-2.0	0.15-0.19	6.6-8.4	Moderate-----	0.28			
6206------------- Thorp Variant	0-16	10-17	1.15-1.35	0.2-0.6	0.22-0.24	4.5-6.5	Low----------	0.37	5	6	3-5
	16-34	15-35	1.35-1.55	0.06-0.2	0.12-0.19	5.1-7.3	Moderate-----	0.37			
	34-60	25-35	1.35-1.60	0.06-0.2	0.14-0.16	5.6-7.3	Moderate-----	0.37			
6397D, 6397F----- Boone Variant	0-6	2-6	1.55-1.65	6.0-20	0.10-0.12	5.1-6.5	Low----------	0.15	2	1	<1
	6-18	0-6	1.55-1.70	6.0-20	0.06-0.08	4.5-5.5	Low----------	0.15			
	18	---	---	---	---	---	-------------	----			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
27B, 27C2, 27D3, 27E: Miami	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
36A, 36B, 36C2: Tama	B	None	---	---	4.0-6.0	Apparent	Nov-Jun	>60	---	High	Moderate	Moderate.
41A: Muscatine	B	None	---	---	2.0-4.0	Apparent	Nov-Jul	>60	---	High	High	Moderate.
45*: Denny	D	None	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
60B2, 60C2: La Rose	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
64B, 64C2: Parr	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
67*: Harpster	B/D	None	---	---	+.5-2.0	Apparent	Feb-Jun	>60	---	High	High	Low.
68, 68+*: Sable	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
69*: Milford	B/D	Occasional	Brief	Apr-Jun	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
73: Ross	B	Rare	---	---	5.0-6.0	Apparent	Feb-Apr	>60	---	Moderate	Low	Low.
76*: Otter	B/D	Occasional	Brief	Apr-Jun	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
82: Millington	B/D	Frequent	Brief	Apr-Jun	0-2.0	Apparent	Mar-Jul	>60	---	High	High	Low.
87A, 87B: Dickinson	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low	Moderate.
88B2, 88D2: Sparta	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Moderate.
93E: Rodman	A	None	---	---	>6.0	---	---	>60	---	Low	Low	Low.
102: La Hogue	B	None	---	---	1.5-3.0	Apparent	Feb-Jun	>60	---	High	High	Moderate.
103*: Houghton	A/D	None	---	---	+1-1.0	Apparent	Sep-Jun	>60	---	High	High	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
125*----------------- Selma	B/D	Occasional	Brief------	Apr-Jun	+.5-2.0	Apparent	Mar-Jun	>60	---	High------	High------	Low.
145B2, 145C2------ Saybrook	B	None----------	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High------	High------	Moderate.
152*----------------- Drummer	B/D	None----------	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High------	High------	Moderate.
154A----------------- Flanagan	B	None----------	---	---	1.5-3.0	Apparent	Apr-Jun	>60	---	High------	High------	Moderate.
171B, 171C2-------- Catlin	B	None----------	---	---	4.0-6.0	Apparent	Feb-May	>60	---	High------	High------	Moderate.
172----------------- Hoopeston	B	None----------	---	---	1.5-3.0	Apparent	Mar-Jun	>60	---	High------	Low-------	Moderate.
198----------------- Elburn	B	None----------	---	---	1.5-3.0	Apparent	Jan-May	>60	---	High------	High------	Moderate.
199A, 199B--------- Plano	B	None----------	---	---	4.0-6.0	Apparent	Mar-May	>60	---	High------	Moderate	Low.
199C2--------------- Plano	B	None----------	---	---	>6.0	---	---	>60	---	High------	Moderate	Low.
200*----------------- Orio	B/D	None----------	---	---	+.5-1.0	Apparent	Apr-Jun	>60	---	High------	High------	Moderate.
201*----------------- Gilford	B/D	Occasional	Brief------	Mar-Jun	+.5-1.0	Apparent	Dec-May	>60	---	High------	High------	Moderate.
204B2--------------- Ayr	B	None----------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
221B, 221B2, 221C2------------- Parr	B	None----------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
233B, 233C2-------- Birkbeck	B	None----------	---	---	3.0-6.0	Apparent	Mar-May	>60	---	High------	High------	Moderate.
243A, 243B--------- St. Charles	B	None----------	---	---	>6.0	---	---	>60	---	High------	Moderate	Moderate.
244*----------------- Hartsburg	B/D	Occasional	Brief------	Apr-Jun	+.5-2.0	Apparent	Mar-Jun	>60	---	High------	High------	Low.
259C2--------------- Assumption	B	None----------	---	---	3.0-4.5	Perched	Feb-May	>60	---	High------	High------	Moderate.
280B, 280C2, 280D- Fayette	B	None----------	---	---	>6.0	---	---	>60	---	High------	Moderate	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Potential frost action	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In				
290A, 290B2, 290C2------------- Warsaw	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
321--------------- Du Page	B	Occasional	Brief-----	Apr-Jun	4.0-6.0	Apparent	Feb-Jun	>60	---	Moderate	Low------	Low.
329--------------- Will	B/D	Occasional	Brief-----	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
332A, 332B, 332C2- Billett	A	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
350*-------------- Drummer	B/D	None---------	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
351--------------- Elburn	B	None---------	---	---	1.5-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
355A-------------- Binghampton	B	None---------	---	---	1.5-3.0	Perched	Nov-Jun	>60	---	High-----	Moderate	Moderate.
357B-------------- Vanpetten	B	None---------	---	---	3.0-5.0	Perched	Nov-Jun	>60	---	Moderate	Moderate	Moderate.
361D2------------- Kidder	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Low.
363C2, 363D2------ Griswold	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Low.
369A, 369B2------- Waupecan	B	None---------	---	---	4.0-6.0	Apparent	Mar-May	>60	---	High-----	Moderate	Moderate.
379B2------------- Dakota	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low------	Moderate.
386B-------------- Downs	B	None---------	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High-----	Moderate	Moderate.
411B, 411C2------- Ashdale	B	None---------	---	---	>6.0	---	---	40-60	Hard	High-----	Moderate	Moderate.
429C-------------- Palsgrove	B	None---------	---	---	>6.0	---	---	40-60	Hard	High-----	High-----	Moderate.
440A, 440B, 440C2- Jasper	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	High.
447--------------- Canisteo	C/D	Occasional	Brief-----	Apr-Jun	0-1.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
451--------------- Lawson	C	Occasional	Brief-----	Mar-Jun	1.0-3.0	Apparent	Nov-May	>60	---	High-----	Moderate	Low.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
490A----------------- Odell	B	None---------	---	---	1.5-3.0	Apparent	Jan-Apr	>60	---	High------	High------	Moderate.
501------------------ Morocco	B	None---------	---	---	1.0-2.0	Apparent	Jan-Apr	>60	---	Moderate	Low-------	High.
503B, 503C2---------- Rockton	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low-------	Low.
504D, 504F----------- Sogn	D	None---------	---	---	>6.0	---	---	4-20	Hard	Moderate	Low-------	Low.
506B2---------------- Hitt	B	None---------	---	---	>6.0	---	---	40-60	Hard	Moderate	Moderate	Moderate.
508*----------------- Selma	B/D	Occasional	Brief------	Apr-Jun	+.5-2.0	Apparent	Apr-Jun	40-60	Hard	High------	High------	Low.
509B, 509D, 509F---- Whalan	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate	Low.
570A, 570B, 570C2, 570D---------------- Martinsville	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
627B2, 627C2--------- Miami	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
648------------------ Clyde	B/D	None---------	---	---	1.0-2.5	Apparent	Nov-Jul	>60	---	High------	High------	Low.
649------------------ Nachusa	B	None---------	---	---	1.5-3.0	Perched	Nov-Jun	>60	---	High------	High------	Moderate.
650B----------------- Prairieville	B	None---------	---	---	4.0-6.0	Apparent	Nov-Jun	>60	---	Moderate	High------	Moderate.
727A----------------- Waukee	B	None---------	---	---	>6.0	---	---	>60	---	Low-------	Low-------	Moderate.
741D3---------------- Oakville	A	None---------	---	---	>6.0	---	---	>60	---	Low-------	Low-------	Moderate.
742B2, 742C2--------- Dickinson	A	None---------	---	---	>6.0	---	---	>60	---	Moderate	Low-------	Moderate.
761D, 761F----------- Eleva	B	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	Low-------	Moderate.
776------------------ Comfrey	B/D	Occasional	Brief------	Apr-Jun	0-30	Apparent	Dec-May	>60	---	High------	High------	Low.
777*----------------- Adrian	A/D	None---------	---	---	+1-1.0	Apparent	Nov-May	>60	---	High------	High------	Moderate.

See footnote at end of table.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
779B, 779D, 779F-- Chelsea	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low------	Low.
781B-------------- Friesland	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
802A**. Orthents												
864**, 865**. Pits												
3067*------------- Harpster	B/D	Occasional	Brief-----	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
4200*------------- Orio	B/D	None--------	---	---	+.5-1.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
4776*------------- Comfrey	B/D	Frequent----	Brief to long.	Apr-Jul	+1-1.0	Apparent	Apr-Jul	>60	---	High-----	High-----	Low.
6206*------------- Thorp Variant	C/D	None--------	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
6397D, 6397F------ Boone Variant	A	None--------	---	---	>6.0	---	---	10-20	Soft	Low------	Low------	High.

* In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

Soil name and location	Parent material	Report number	Depth	Moisture density: Max. dry density	Moisture density: Optimum moisture	Percentage passing sieve--: No. 4	Percentage passing sieve--: No. 10	Percentage passing sieve--: No. 40	Percentage passing sieve--: No. 200	Liquid limit	Plasticity index	Classification: AASHTO	Classification: Unified
			In	Lb/cu ft	Pct					Pct			
Binghampton sandy loam: 975 feet east and 205 feet south of the center of sec. 16, T. 20 N., R. 9 E.	Loamy eolian sediments, sandy outwash, and loamy till.	S80IL103											
		4-1	0-8	118	14	---	100	90	46	20	5	A-4(0)	SM-SC
		4-4	17-24	107	16	---	100	92	54	28	10	A-4(2)	CL
		4-6	27-36	113	13	100	99	77	13	---	NP	A-2-4 (0)	SM
		4-7	36-51	113	12	---	100	85	10	---	NP	A-2-4 (0)	SP-SM
		4-9	54-66	110	16	100	96	79	61	34	19	A-6(9)	CL
Birkbeck silt loam: 190 feet north and 1,700 feet west of the southeast corner of sec. 36, T. 22 N., R. 8 E.	Loess and loamy till.	S79IL103											
		30-1	0-7	100	18	100	98	97	95	30	7	A-4(6)	ML
		30-3	17-23	99	21	---	100	99	96	44	23	A-7-6 (24)	CL
		30-6	40-51	107	17	100	99	95	71	33	16	A-6(9)	CL
		30-7	51-70	112	14	---	100	94	68	27	13	A-6(6)	CL
Canisteo silt loam: 210 feet north and 444 feet east of the southeast corner of sec. 33, T. 39 N., R. 1 E.	Loamy and silty lacustrine sediments.	S76IL103											
		4-1	0-8	97	21	100	99	94	75	42	14	A-7-6 (11)	ML
		4-5	25-33	110	16	100	98	95	89	35	13	A-6(12)	CL
		4-9	54-60	108	14	100	98	79	25	---	NP	A-2-4 (0)	SM
Chelsea fine sand: 1,294 feet north and 876 feet east of the southwest corner of sec. 9, T. 19 N., R. 10 E.	Eolian sand.	S79IL103											
		9-1	3-6	114	11	---	100	97	16	---	NP	A-2-4 (0)	SM
		9-4	26-40	105	14	---	100	98	3	---	NP	A-3(0)	SP
Nachusa silt loam: 246 feet east and 952 feet north of the southwest corner of sec. 10, T. 20 N., R. 10 E.	Silty or loamy eolian sediments and glacial till.	S78IL103											
		13-1	0-11	98	20	---	100	98	88	39	15	A-6(14)	CL
		13-3	16-23	94	22	---	100	95	86	42	19	A-7-6 (17)	CL
		13-5	33-46	100	21	---	100	95	78	46	26	A-7-6 (20)	CL
		13-6	46-60	119	13	---	100	93	65	26	11	A-6(5)	CL
Prairieville silt loam: 1,855 feet north and 346 feet west of the southeast corner of sec. 5, T. 20 N., R. 10 E.	Silty and loamy eolian sediments and glacial till.	S77IL103											
		37-1	0-9	105	17	---	100	95	64	28	9	A-4(3)	CL
		37-6	31-41	95	23	100	99	95	72	47	29	A-7-6 (19)	CL
		37-7	41-57	103	19	100	99	93	65	38	22	A-6(11)	CL
Vanpetten loam: 287 feet north and 2,538 feet west of the southeast corner of sec. 19, T. 21 N., R. 9 E.	Loamy eolian sediments, sandy outwash, and glacial till.	S76IL103											
		2-1	0-6	100	19	100	97	87	69	36	16	A-6(9)	CL
		2-4	16-24	100	22	---	100	95	85	38	16	A-6(14)	CL
		2-7	37-50	118	11	---	100	72	15	---	NP	A-2-4 (0)	SM
		2-8	50-66	104	18	100	99	95	69	47	33	A-7-6 (20)	CL

TABLE 19.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adrian	Sandy or sandy-skeletal, mixed, euic, mesic Terric Medisaprists
Ashdale	Fine-silty, mixed, mesic Typic Argiudolls
*Assumption	Fine-silty, mixed, mesic Typic Argiudolls
*Ayr	Fine-loamy, mixed, mesic Typic Argiudolls
Billett	Coarse-loamy, mixed, mesic Mollic Hapludalfs
Binghampton	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aquollic Hapludalfs
Birkbeck	Fine-silty, mixed, mesic Typic Hapludalfs
Boone Variant	Mesic, uncoated, shallow Typic Quartzipsamments
Canisteo	Fine-loamy, mixed (calcareous), mesic Typic Haplaquolls
Catlin	Fine-silty, mixed, mesic Typic Argiudolls
Chelsea	Mixed, mesic Alfic Udipsamments
Clyde	Fine-loamy, mixed, mesic Typic Haplaquolls
Comfrey	Fine-loamy, mixed, mesic Cumulic Haplaquolls
*Dakota	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Denny	Fine, montmorillonitic, mesic Mollic Albaqualfs
Dickinson	Coarse-loamy, mixed, mesic Typic Hapludolls
Downs	Fine-silty, mixed, mesic Mollic Hapludalfs
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls
Du Page	Fine-loamy, mixed, mesic Cumulic Hapludolls
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls
Eleva	Coarse-loamy, mixed, mesic Typic Hapludalfs
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Flanagan	Fine, montmorillonitic, mesic Aquic Argiudolls
Friesland	Fine-loamy, mixed, mesic Typic Argiudolls
*Gilford	Coarse-loamy, mixed, mesic Typic Haplaquolls
*Griswold	Fine-loamy, mixed, mesic Typic Argiudolls
*Harpster	Fine-silty, mesic Typic Calciaquolls
Hartsburg	Fine-silty, mixed, mesic Typic Haplaquolls
*Hitt	Fine-loamy, mixed, mesic Typic Argiudolls
Hoopeston	Coarse-loamy, mixed, mesic Aquic Hapludolls
Houghton	Euic, mesic Typic Medisaprists
Jasper	Fine-loamy, mixed, mesic Typic Argiudolls
Kidder	Fine-loamy, mixed, mesic Typic Hapludalfs
La Hogue	Fine-loamy, mixed, mesic Aquic Argiudolls
La Rose	Fine-loamy, mixed, mesic Typic Argiudolls
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls
Martinsville	Fine-loamy, mixed, mesic Typic Hapludalfs
Miami	Fine-loamy, mixed, mesic Typic Hapludalfs
Milford	Fine, mixed, mesic Typic Haplaquolls
*Millington	Fine-loamy, mixed (calcareous), mesic Cumulic Haplaquolls
Morocco	Mixed, mesic Aquic Udipsamments
*Muscatine	Fine-silty, mixed, mesic Aquic Hapludolls
Nachusa	Fine-loamy, mixed, mesic Aquic Argiudolls
Oakville	Mixed, mesic Typic Udipsamments
Odell	Fine-loamy, mixed, mesic Aquic Argiudolls
*Orio	Fine-loamy, mixed, mesic Mollic Ochraqualfs
Orthents	Loamy, mixed, nonacid, mesic Udorthents
Otter	Fine-silty, mixed, mesic Cumulic Haplaquolls
Palsgrove	Fine-silty, mixed, mesic Typic Hapludalfs
Parr	Fine-loamy, mixed, mesic Typic Argiudolls
Plano	Fine-silty, mixed, mesic Typic Argiudolls
Prairieville	Fine-loamy, mixed, mesic Typic Argiudolls
Rockton	Fine-loamy, mixed, mesic Typic Argiudolls
Rodman	Sandy-skeletal, mixed, mesic Typic Hapludolls
Ross	Fine-loamy, mixed, mesic Cumulic Hapludolls
Sable	Fine-silty, mixed, mesic Typic Haplaquolls
*Saybrook	Fine-silty, mixed, mesic Typic Argiudolls
Selma	Fine-loamy, mixed, mesic Typic Haplaquolls
*Sogn	Loamy, mixed, mesic Lithic Haplustolls
*Sparta	Sandy, mixed, mesic Entic Hapludolls
St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs
Tama	Fine-silty, mixed, mesic Typic Argiudolls
Thorp Variant	Fine-loamy, mixed, mesic Typic Argialbolls
Vanpetten	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Hapludolls
Warsaw	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls
Waukee	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Hapludolls
Waupecan	Fine-silty, mixed, mesic Typic Argiudolls
Whalan	Fine-loamy, mixed, mesic Typic Hapludalfs
Will	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Haplaquolls

* The soil is a taxadjunct to the series. See text for description of those characteristics of the soil that are outside the range of the series.

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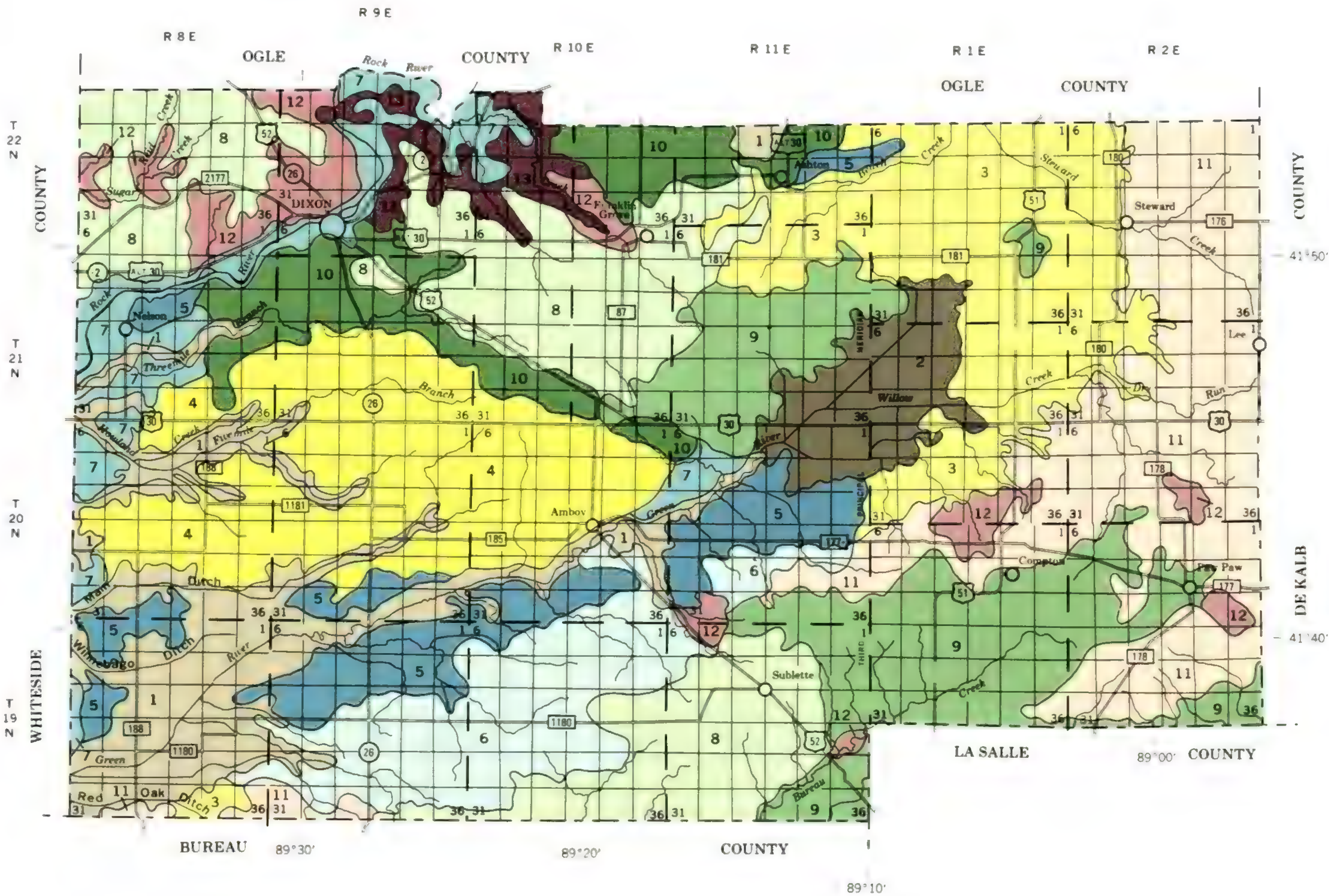


LEGEND*

NEARLY LEVEL, POORLY DRAINED AND VERY POORLY DRAINED SOILS ON LOW LYING OUTWASH PLAINS AND LAKE PLAINS THAT ARE SUBJECT TO FLOODING

1 Selma-Gilford association. Loamy, poorly drained and very poorly drained soils that formed in loamy material and in glacial outwash

2 Harpster-Hartsburg-Canisteo association. Silty, poorly drained soils that formed in loess or silty lakebed deposits

NEARLY LEVEL, POORLY DRAINED AND SOMEWHAT POORLY DRAINED SOILS ON TILL PLAINS AND OUTWASH PLAINS

3 Drummer-Elburn association. Silty, poorly drained and somewhat poorly drained soils that formed in loess and the underlying glacial outwash

4 Clyde-Binghampton-Nachusa association. Loamy and silty, poorly drained and somewhat poorly drained soils that formed in erosional sediments or eolian material and in the underlying glacial till

NEARLY LEVEL TO STEEP, EXCESSIVELY DRAINED, SOMEWHAT EXCESSIVELY DRAINED, WELL DRAINED, AND POORLY DRAINED SOILS ON OUTWASH PLAINS, TILL PLAINS, DUNES, AND TERRACES

5 Chelsea-Sparta-Orio association. Sandy and loamy, excessively drained and poorly drained soils that formed in eolian sand or in loamy sediments and the underlying sandy outwash

6 Parr-Ayr-Chelsea association. Loamy and sandy, well drained and excessively drained soils that formed in loess or loamy eolian material and the underlying glacial till or in sandy eolian deposits

7 Waukee-Dickinson-Dakota association. Silty and loamy, well drained and somewhat excessively drained soils that formed in loamy eolian material or in loamy and silty sediments and the underlying glacial outwash

NEARLY LEVEL TO SLOPING, WELL DRAINED TO POORLY DRAINED SOILS ON LOESS-COVERED UPLANDS, TILL PLAINS, AND OUTWASH PLAINS

8 Tama-Muscatine-Sable association. Silty, moderately well drained to poorly drained soils that formed in loess

9 Catlin-Drummer association. Silty, moderately well drained and poorly drained soils that formed in loess and the underlying glacial till or glacial outwash

10 Jasper-Vanpetten-Nachusa association. Silty and loamy, well drained to somewhat poorly drained soils that formed in loamy, silty, and sandy material and the underlying weathered glacial till

GENTLY SLOPING TO STEEP, MODERATELY WELL DRAINED TO SOMEWHAT EXCESSIVELY DRAINED SOILS ON UPLANDS, TILL PLAINS, AND MORAINES

11 Saybrook-Parr association. Silty, moderately well drained and well drained soils that formed in loess and the underlying glacial till

12 Fayette-Birkbeck-Miami association. Silty, well drained and moderately well drained soils that formed in loess or in loess and the underlying glacial till

13 Eleva-Griswold-Whalen association. Loamy, somewhat excessively drained and well drained soils that formed in residuum of sandstone, in glacial till, or in glacial till and the underlying residuum of limestone

* The texture terms in the descriptive headings refer to the surface layer of the major soils in the association.

Compiled 1983

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

N

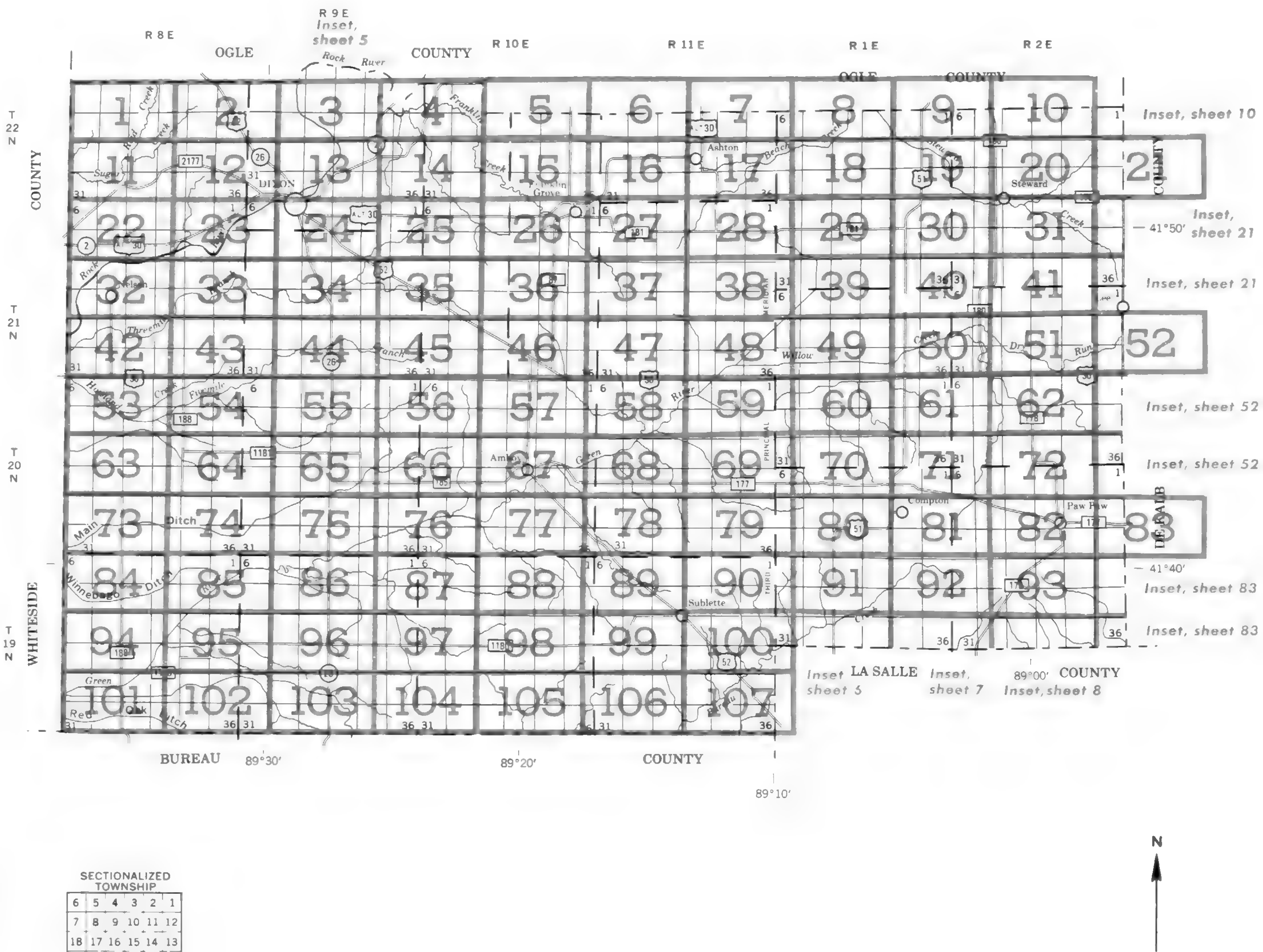
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

LEE COUNTY, ILLINOIS

Scale 1 : 253,440

1 0 1 2 3 4 Miles



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

INDEX TO MAP SHEETS

LEE COUNTY, ILLINOIS

Scale 1:253,440

1 0 1 2 3 4 Miles

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number 2 following the slope letter indicates that the soil is eroded and 3 that it is severely eroded.

SYMBOL	NAME
27B	Miami silt loam, 2 to 5 percent slopes
27C2	Miami silt loam, 5 to 10 percent slopes, eroded
27D3	Miami clay loam, 8 to 15 percent slopes, severely eroded
27E	Miami loam, 15 to 25 percent slopes
36A	Tama silt loam, 0 to 2 percent slopes
36B	Tama silt loam, 2 to 5 percent slopes
36C2	Tama silt loam, 5 to 10 percent slopes, eroded
41A	Muscatine silt loam, 0 to 3 percent slopes
45	Denny silt loam
60B2	La Rose loam, 2 to 5 percent slopes, eroded
60C2	La Rose loam, 5 to 10 percent slopes, eroded
64B	Parr fine sandy loam, 2 to 5 percent slopes
64C2	Parr fine sandy loam, 5 to 10 percent slopes, eroded
67	Harpster silty clay loam
68	Sable silty clay loam
68+	Sable silt loam, overwash
69	Milford silty clay loam
73	Ross silt loam
76	Otter silt loam
82	Millington silty clay loam
87A	Dickinson sandy loam, 0 to 3 percent slopes
87B	Dickinson sandy loam, 3 to 7 percent slopes
88B2	Sparta loamy sand, 1 to 7 percent slopes, eroded
88D2	Sparta loamy sand, 7 to 20 percent slopes, eroded
93E	Rodman gravelly sandy loam, 12 to 20 percent slopes
102	La Hogue loam
103	Houghton muck
125	Selma loam
145B2	Saybrook silt loam, 2 to 5 percent slopes, eroded
145C2	Saybrook silt loam, 5 to 10 percent slopes, eroded
152	Drummer silty clay loam
154A	Flanagan silt loam, 0 to 3 percent slopes
171B	Catlin silt loam, 1 to 5 percent slopes
171C2	Catlin silt loam, 5 to 10 percent slopes, eroded
172	Hoopeston fine sandy loam
198	Elburn silt loam
199A	Plano silt loam, 0 to 2 percent slopes
199B	Plano silt loam, 2 to 5 percent slopes
199C2	Plano silt loam, 5 to 10 percent slopes, eroded
200	Orio sandy loam
201	Gilford fine sandy loam
204B2	Ayr sandy loam, 1 to 7 percent slopes, eroded
221B	Parr silt loam, 2 to 5 percent slopes
221B2	Parr silt loam, 2 to 5 percent slopes, eroded
221C2	Parr silt loam, 5 to 10 percent slopes, eroded
233B	Birkbeck silt loam, 2 to 5 percent slopes
233C2	Birkbeck silt loam, 5 to 10 percent slopes, eroded
243A	St. Charles silt loam, 0 to 2 percent slopes
243B	St. Charles silt loam, 2 to 5 percent slopes
244	Hartsburg silty clay loam
259C2	Assumption silt loam, 4 to 12 percent slopes, eroded
280B	Fayette silt loam, 2 to 5 percent slopes
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded
280D	Fayette silt loam, 10 to 15 percent slopes
290A	Warsaw loam, 0 to 2 percent slopes
290B2	Warsaw silt loam, 2 to 5 percent slopes, eroded
290C2	Warsaw loam, 5 to 10 percent slopes, eroded
321	Du Page silt loam
329	Will loam
332A	Billett fine sandy loam, 0 to 3 percent slopes
332B	Billett fine sandy loam, 3 to 7 percent slopes
332C2	Billett fine sandy loam, 5 to 12 percent slopes, eroded
350	Drummer silty clay loam, gravelly substratum
351	Elburn silt loam, gravelly substratum
355A	Binghamton sandy loam, 0 to 3 percent slopes
357B	Vanpetten loam, 1 to 5 percent slopes
361D2	Kidder silt loam, 10 to 15 percent slopes, eroded
363C2	Griswold loam, 5 to 10 percent slopes, eroded
363D2	Griswold loam, 10 to 15 percent slopes, eroded
369A	Waupecan silt loam, 0 to 2 percent slopes
369B2	Waupecan silt loam, 2 to 5 percent slopes, eroded
379B2	Dakota sandy loam, 1 to 7 percent slopes, eroded
386B	Downs silt loam, 2 to 5 percent slopes
411B	Ashdale silt loam, 2 to 5 percent slopes
411C2	Ashdale silt loam, 5 to 10 percent slopes, eroded
429C	Palsgrove silt loam, 5 to 10 percent slopes
440A	Jasper silt loam, 0 to 2 percent slopes
440B	Jasper silt loam, 2 to 5 percent slopes
440C2	Jasper silt loam, 5 to 10 percent slopes, eroded
447	Canisteo silt loam, sandy substratum
451	Lawson silt loam
490A	Odell silt loam, 0 to 3 percent slopes
501	Morocco loamy fine sand
503B	Rockton silt loam, 2 to 5 percent slopes
503C2	Rockton silt loam, 5 to 10 percent slopes, eroded
504D	Sogn loam, 7 to 15 percent slopes
504F	Sogn loam, 15 to 35 percent slopes
506B2	Hitt loam, 2 to 5 percent slopes, eroded
508	Selma loam, bedrock substratum
509B	Whalan loam, 2 to 7 percent slopes
509D	Whalan loam, 7 to 15 percent slopes
509F	Whalan loam, 15 to 35 percent slopes
570A	Martinsville silt loam, 0 to 2 percent slopes
570B	Martinsville silt loam, 2 to 5 percent slopes
570C2	Martinsville silt loam, 5 to 10 percent slopes, eroded
570D	Martinsville silt loam, 10 to 15 percent slopes
627B2	Miami fine sandy loam, 2 to 5 percent slopes, eroded
627C2	Miami fine sandy loam, 5 to 10 percent slopes, eroded
648	Clyde clay loam
649	Nachusa silt loam
650B	Prairieville silt loam, 1 to 5 percent slopes
727A	Waukee silt loam, 0 to 3 percent slopes
741D3	Oakville fine sand, 7 to 20 percent slopes, severely eroded
742B2	Dickinson sandy loam, loamy substratum, 1 to 5 percent slopes, eroded
742C2	Dickinson sandy loam, loamy substratum, 5 to 10 percent slopes, eroded
761D	Eleva fine sandy loam, 7 to 15 percent slopes
761F	Eleva fine sandy loam, 15 to 35 percent slopes
776	Comfrey loam
777	Adrian muck
779B	Chelsea fine sand, 1 to 7 percent slopes
779D	Chelsea fine sand, 7 to 20 percent slopes
779F	Chelsea fine sand, 20 to 35 percent slopes
781B	Friesland fine sandy loam, 1 to 4 percent slopes
802A	Orthents, loamy, nearly level
864	Pits, quarries
865	Pits, gravel
3067	Harpster silty clay loam, occasionally flooded
4200	Orio mucky sandy loam, ponded
4776	Comfrey silt loam, ponded
6206	Thorp Variant, silt loam
6397D	Boone Variant, loamy fine sand, 7 to 15 percent slopes
6397F	Boone Variant, loamy fine sand, 15 to 35 percent slopes

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County or parish
- Reservation (national forest or park, state forest or park, and large airport)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads

ROAD EMBLEMS & DESIGNATIONS

- Federal (410)
- State (52)

RAILROAD

DAMS

- Medium or small (water)

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Church
- School

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water)

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (152, 154A)

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

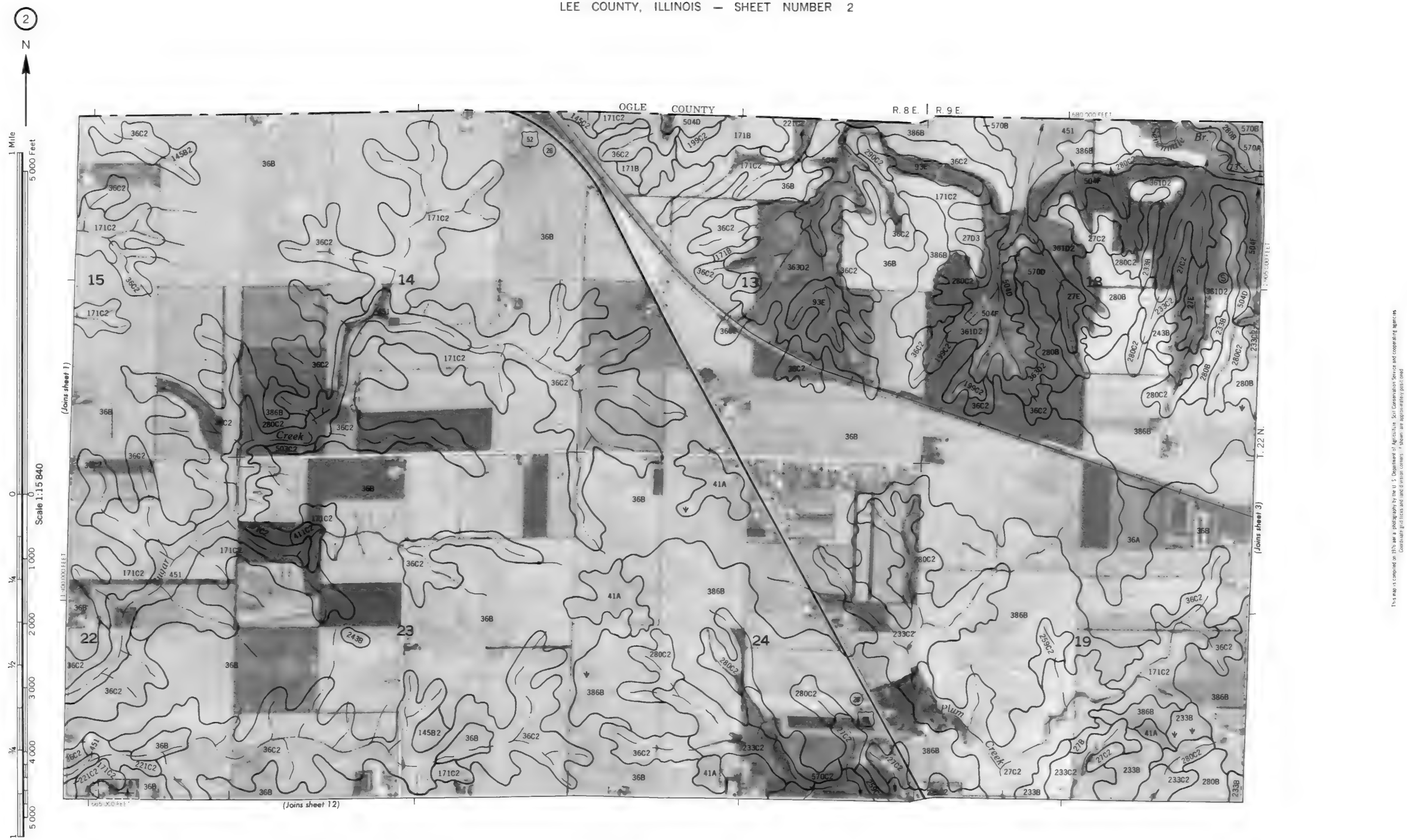
DEPRESSION OR SINK

SOIL SAMPLE SITE (S)

MISCELLANEOUS

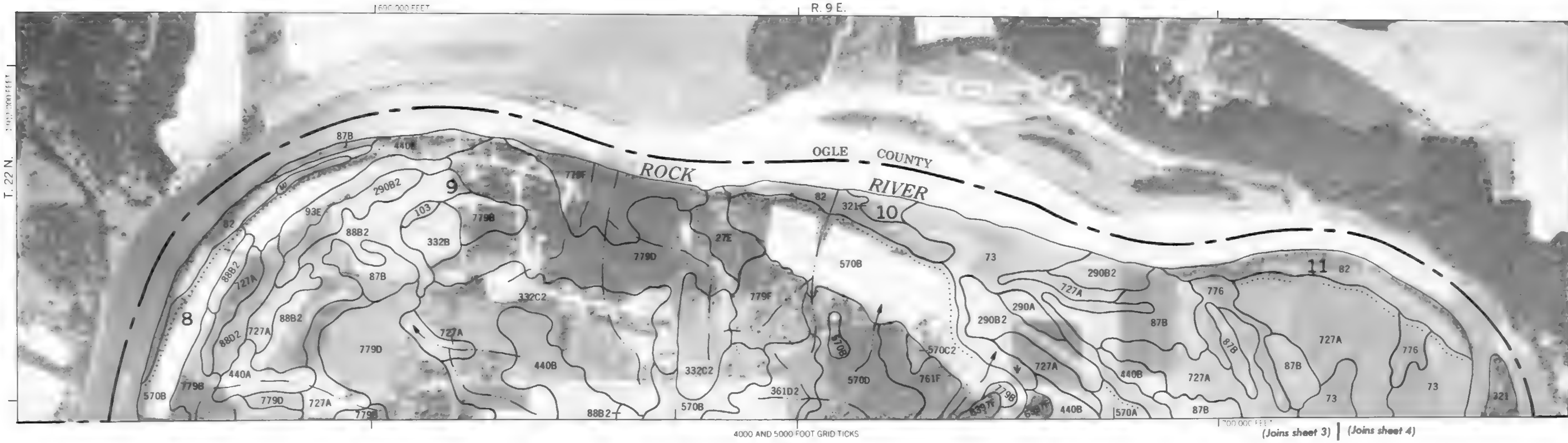
- Blowout
- Gravelly spot
- Dumps and other similar non soil areas
- Rock outcrop (includes sandstone and shale)
- Sandy spot
- Severely eroded spot
- Muck spot
- Calcareous spot
- Thorp Variant spot
- Calcareous glacial till spot

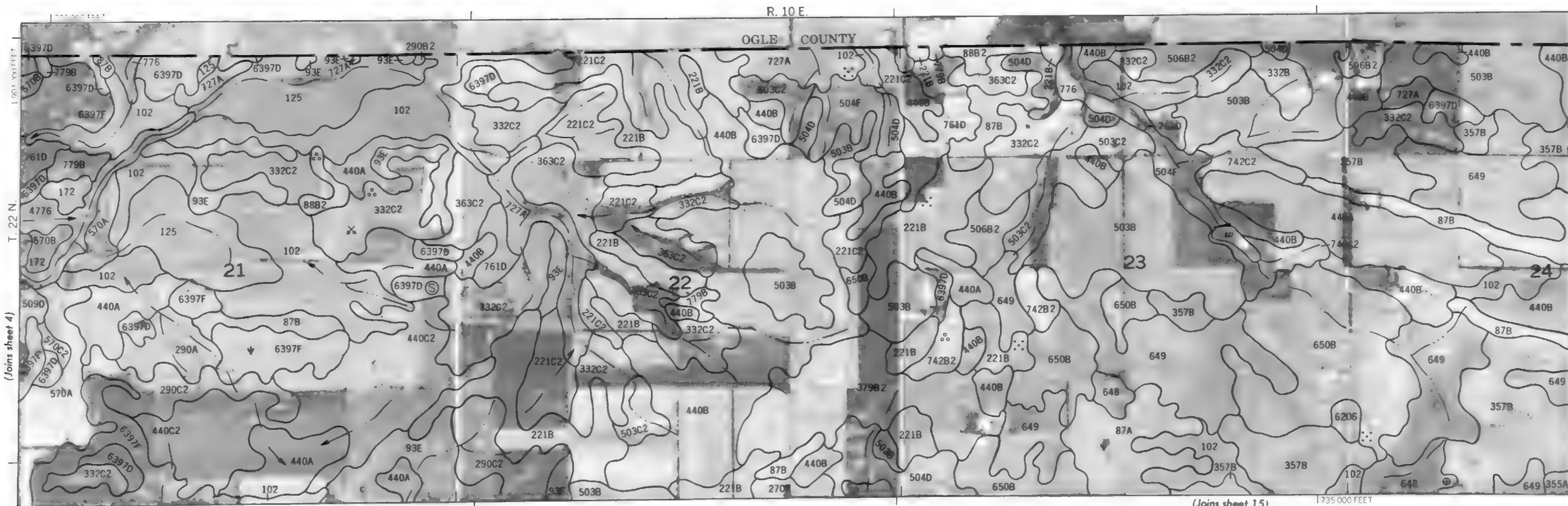

1
N
OGLE COUNTY
R 8 E
WHITESIDE COUNTY
T 22 N
(Joins sheet 2)
(Joins sheet 11)
Wild Creek
Reid Creek
15
16
17
18
19
20
21
22
1 Mile
5 000 Feet
Scale 1:15 840
36B
36C2
36A
41A
73
76
145C2
171B
171C2
199C2
221C2
233C2
259C2
280B
280C2
361D2
363C2
386B
411B
411C2
440C2
451
503C2
504D
509F


2
N
OGLE COUNTY
R. 8 E. | R. 9 E.
T. 22 N.
(Joins sheet 1)
(Joins sheet 3)
(Joins sheet 12)
Scale 1:15 840
1 Mile
5 000 Feet
15
14
13
18
22
23
24
19
Sugar
Creek
Plum
Creek
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

3
N
OGLE COUNTY
R 9 E
(Joins inset, sheet 5)
(Joins sheet 4)
(Joins sheet 2)
(Joins sheet 13)
T 22 N
Sevenmile Branch
LOWELL PARK
ROCK RIVER
ROCK RIVER
OGLE CO.
14
15
16
17
20
21
22
23
Scale 1:15 840
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000


4
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins inset, sheet 5)
R. 9 E. | R. 10 E.
OGLE COUNTY
OGLE COUNTY
ROCK RIVER
OGLE COUNTY
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 14)
Kingdom
Franklin Creek
Chamberlain Creek
T. 22 N.
13
14
17
18
19
20
23
24





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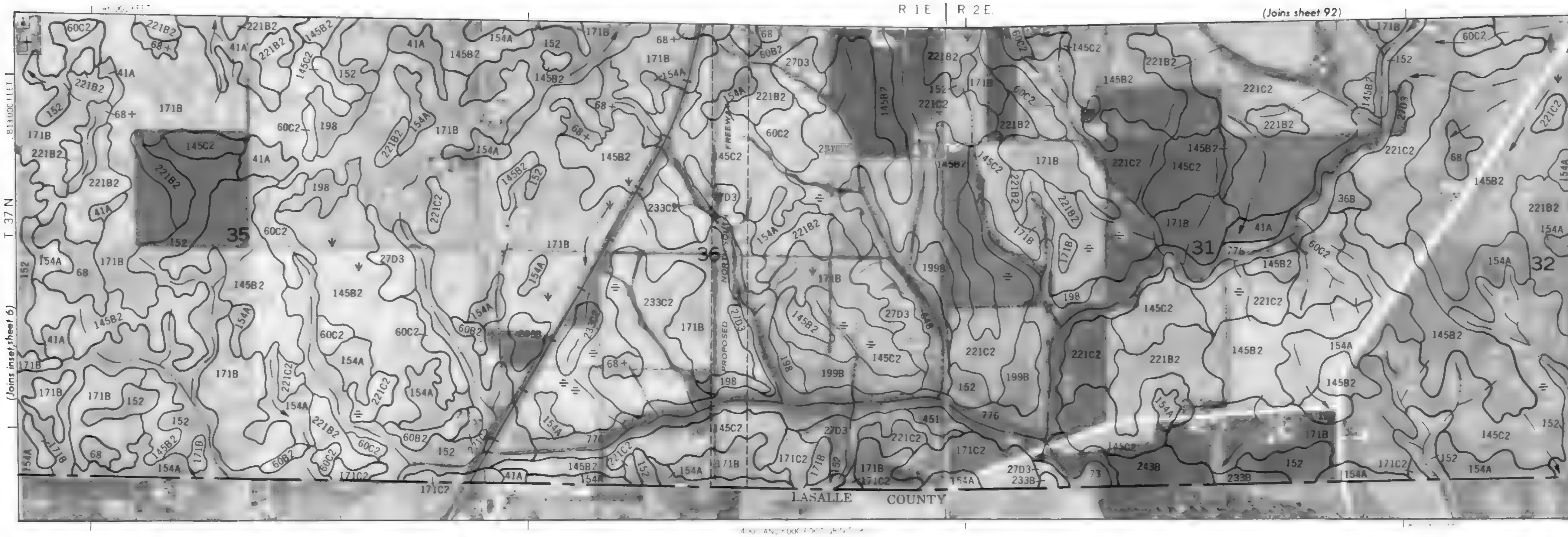
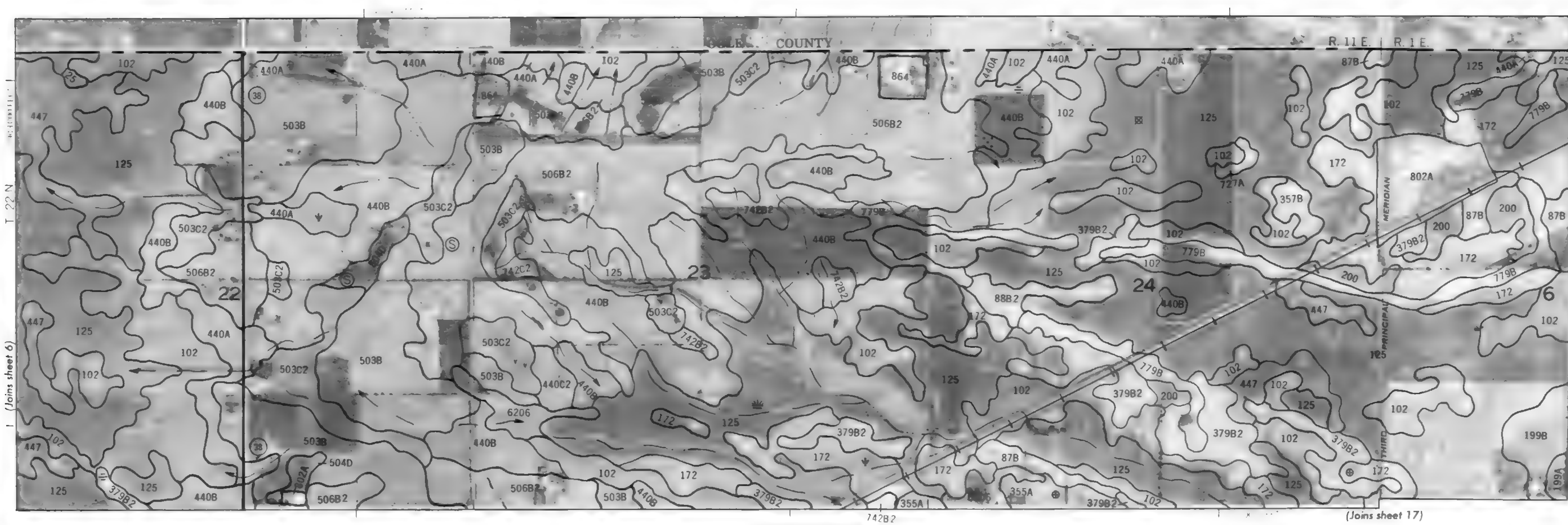

R. 1 E. | R. 2 E.
(Joins sheet 92)
T. 37 N.
(Joins inset sheet 6)
(Joins inset sheet 8)
35
36
31
32
PROPOSED
NORTH TOLLWAY
FREEWAY
LASALLE COUNTY

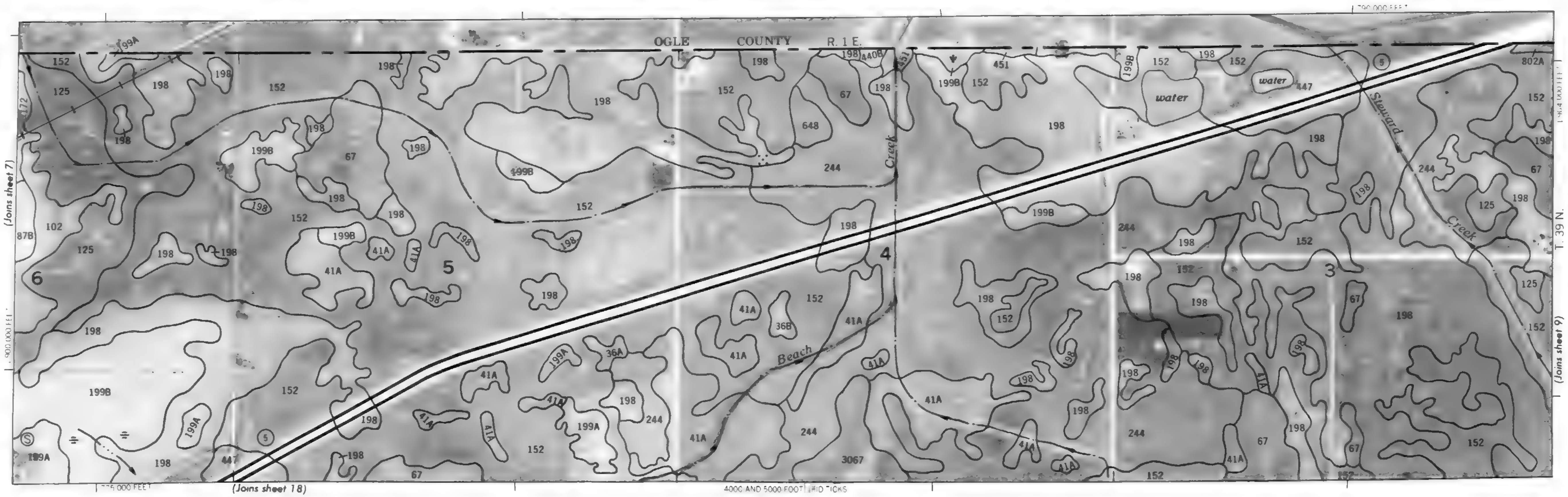

OGLE COUNTY
R. 11 E. | R. 1 E.
T. 22 N.
T. 39 N.
(Joins sheet 6)
(Joins sheet 8)
22
23
24
6
THIRD PRINCIPAL MERIDIAN
(Joins sheet 17)


N
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1
0
1 000
2 000
3 000
4 000
5 000

8

N

1 Mile
5 000 Feet
Scale 1:15 840



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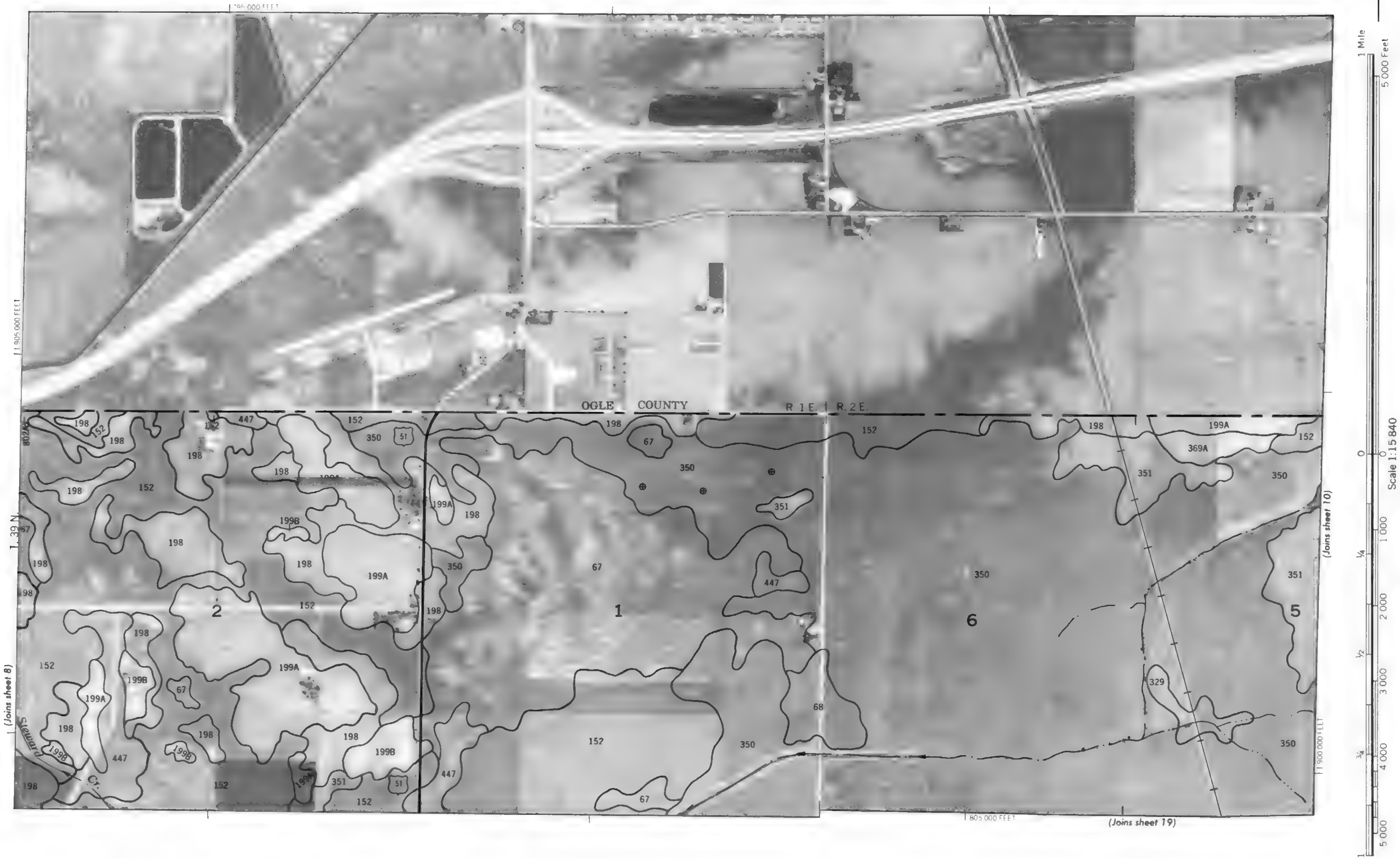
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


9
N
OGLE COUNTY
R.1E. | R.2E.
T.39N.
(Joins sheet 8)
(Joins sheet 10)
(Joins sheet 19)
1 905 000 FEET
1 900 000 FEET
805 000 FEET
1
2
5
6
198
152
350
51
447
199A
199B
67
351
369A
329
68
802A
Steward Cr.
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000

This map is compiled on 19[illegible] aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


11
N
(Joins sheet 1)
R 8 E
WHITESIDE COUNTY
T 22 N
(Joins sheet 12)
(Joins sheet 22)
Scale 1:15 840
1 Mile
5 000 Feet
30
29
28
27
31
32
33
34
Sugar Creek
Reid Creek
Creek
Palmyra
Prairieville

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

13

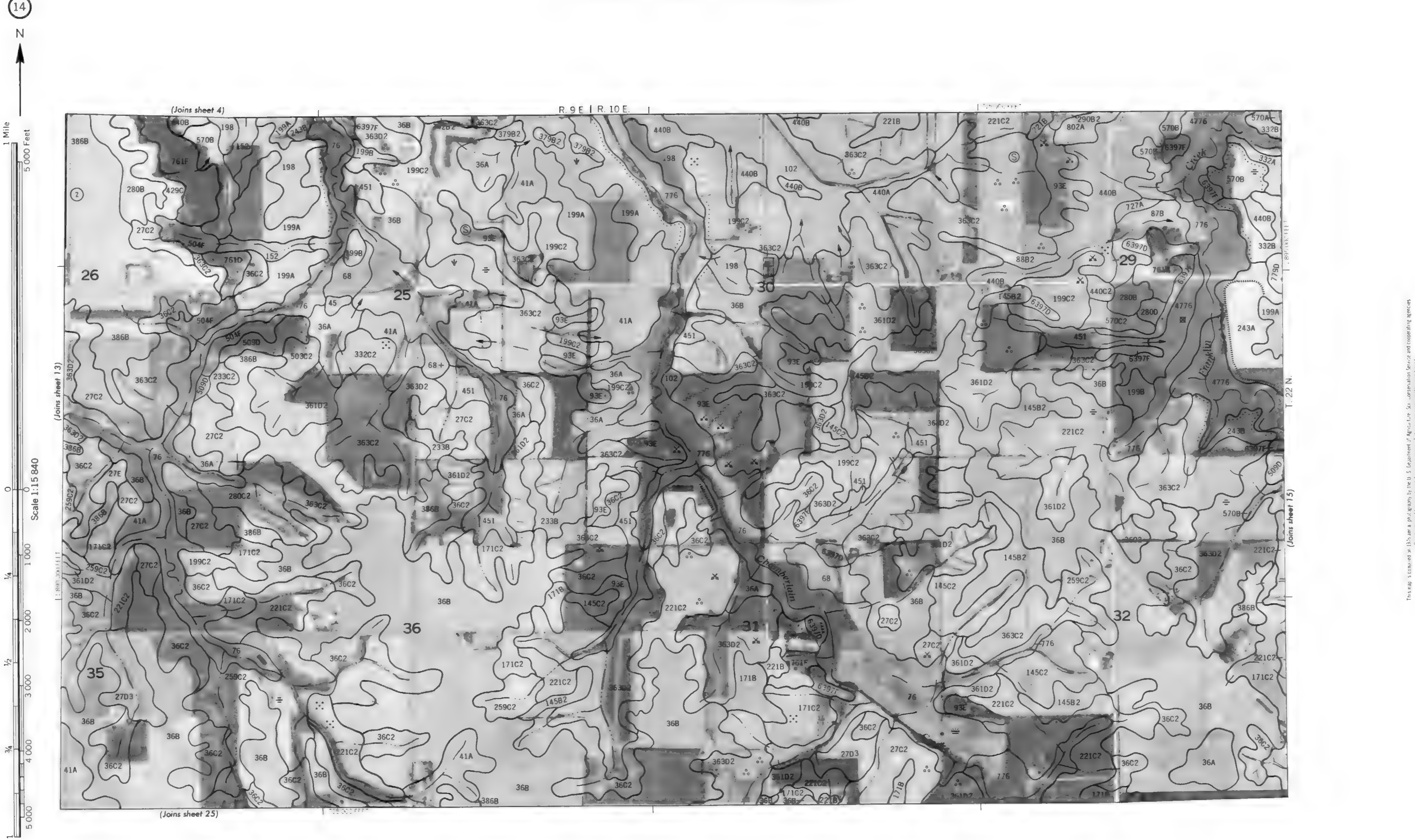
N

1 Mile

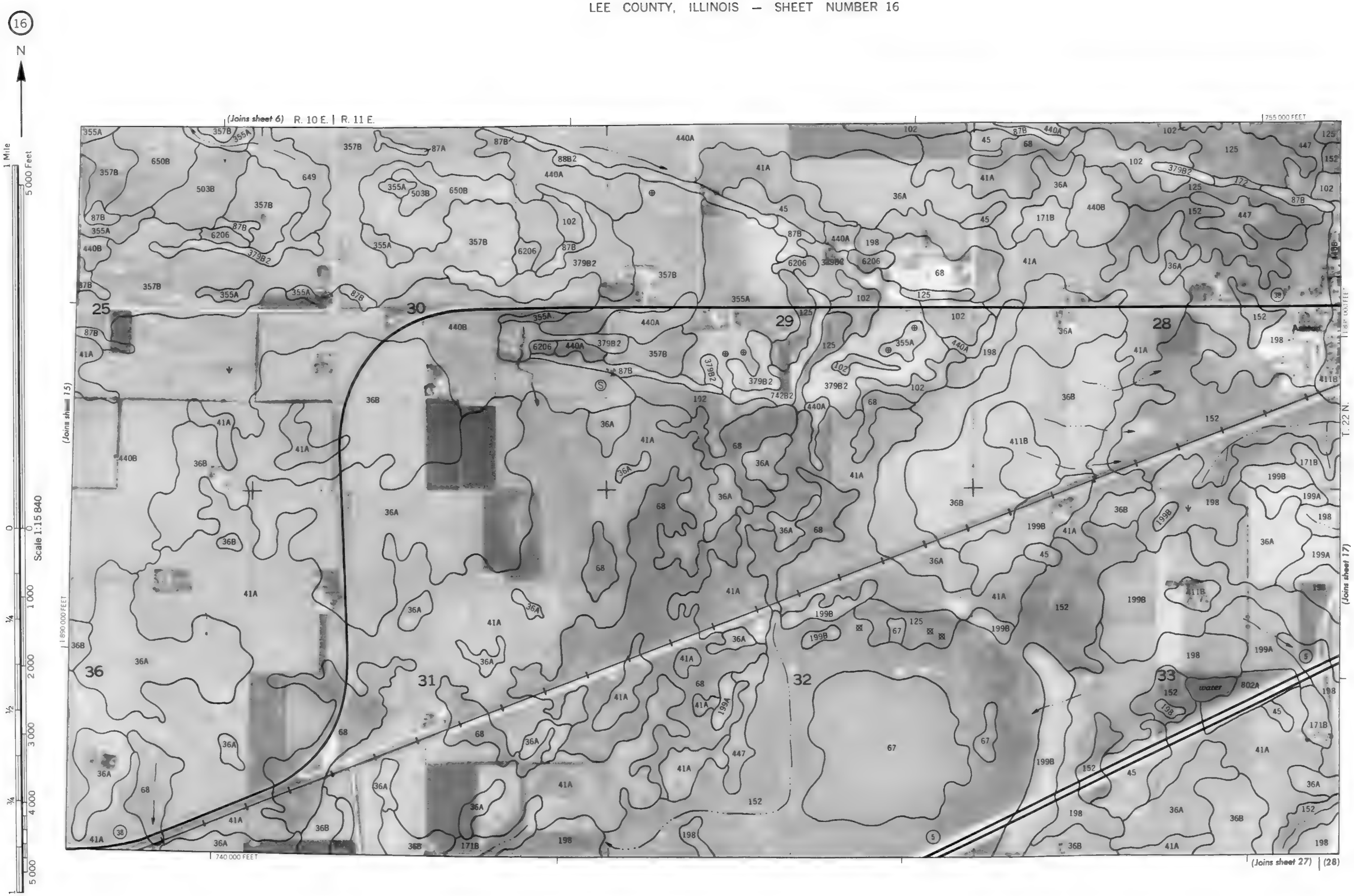
5 000 Feet

Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

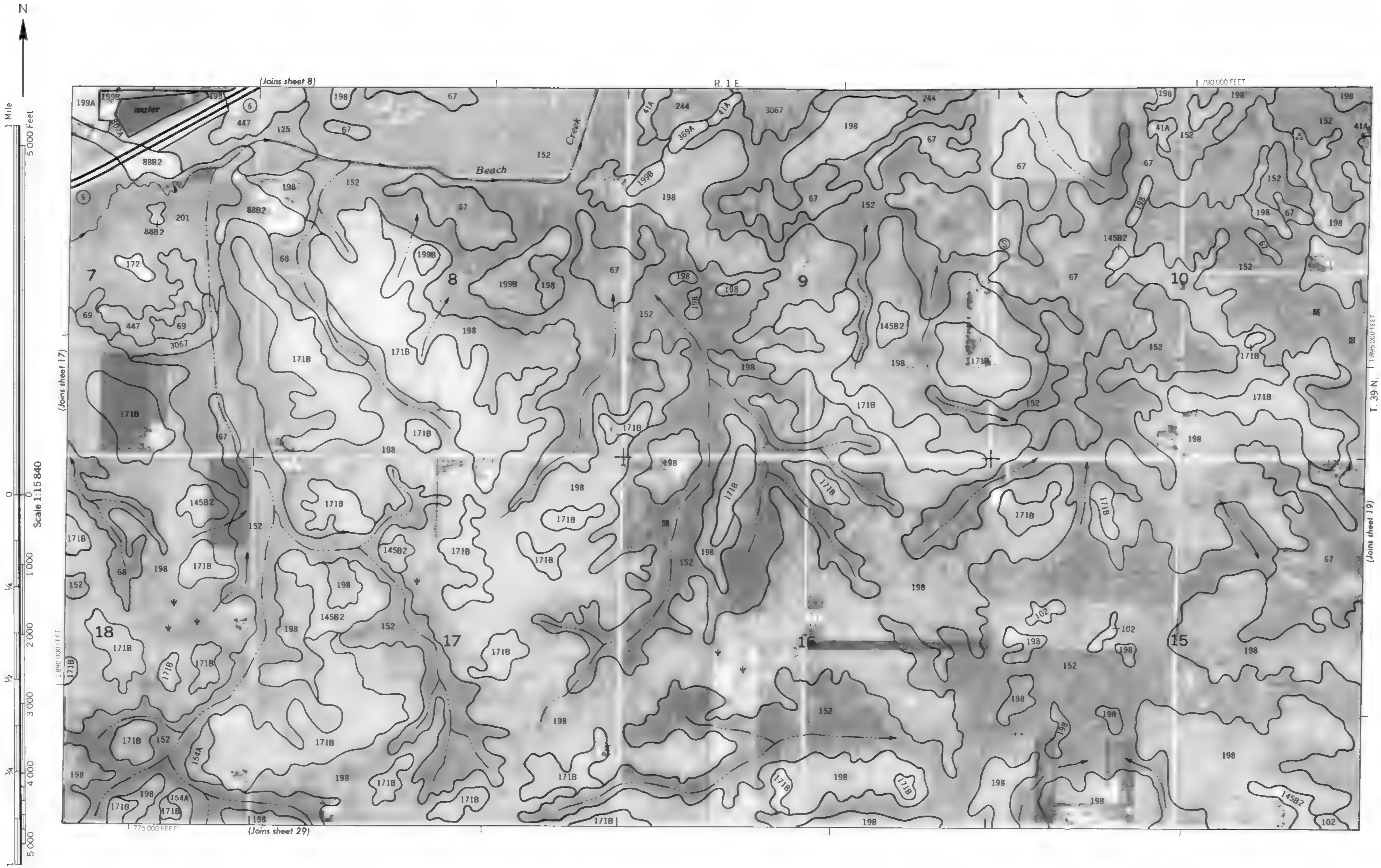

14
N
(Joins sheet 4)
R. 9 E. | R. 10 E.
(Joins sheet 13)
(Joins sheet 15)
(Joins sheet 25)
T. 22 N.
1 Mile
5 000 Feet
Scale 1:15 840
26
25
30
29
35
36
31
32
Chamberlain
Franklin
Creek

LEE COUNTY, ILLINOIS — SHEET NUMBER 15

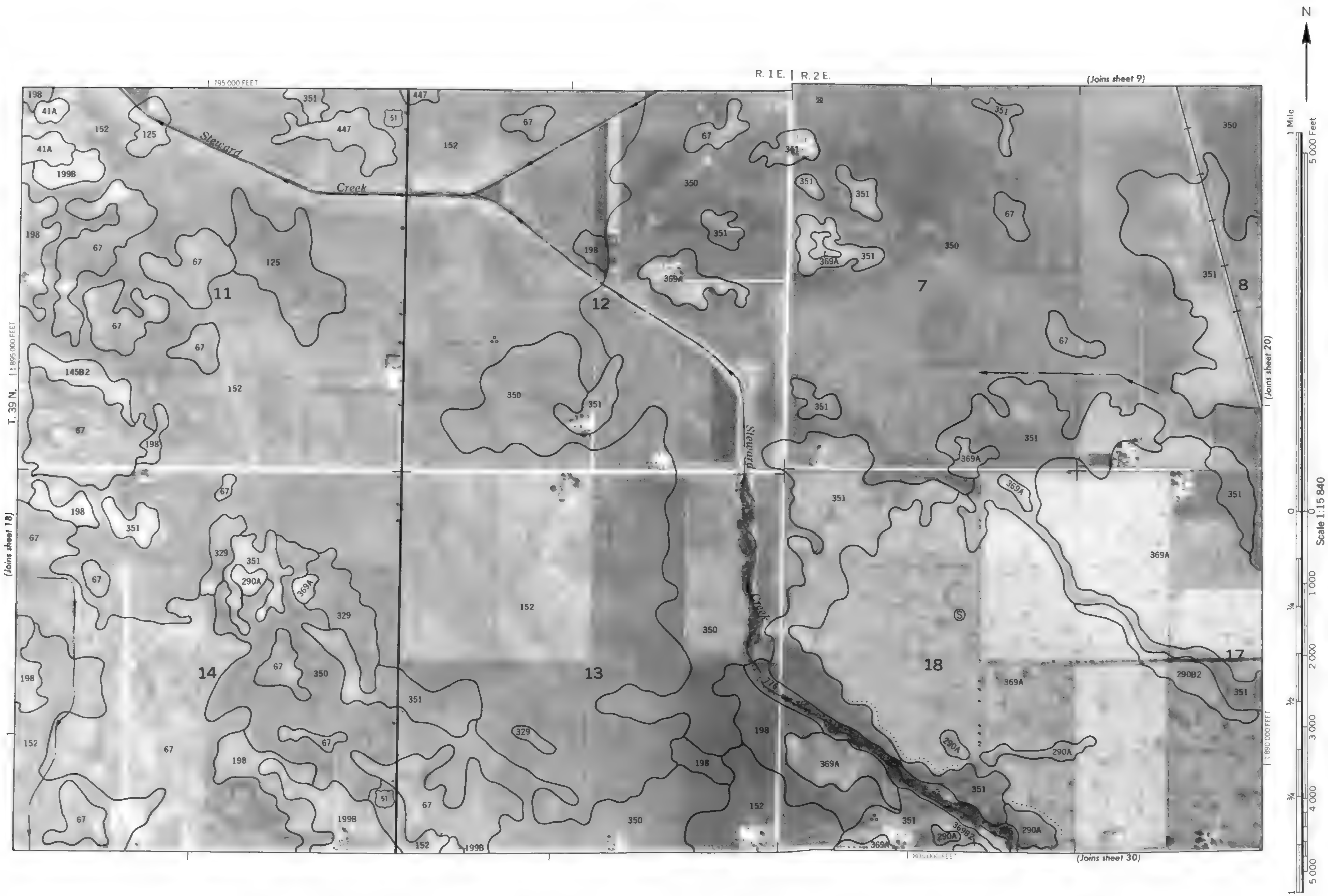


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

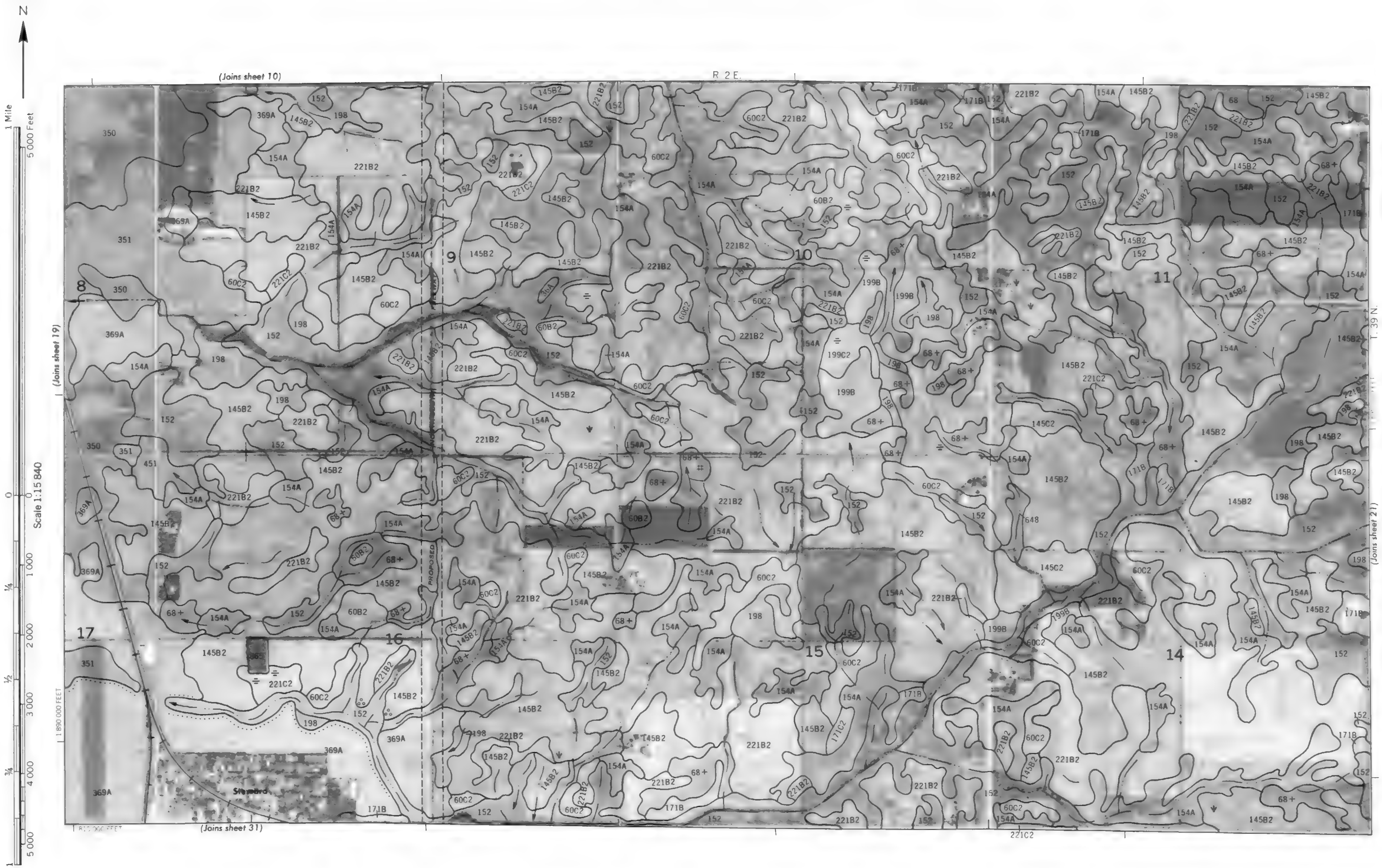
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



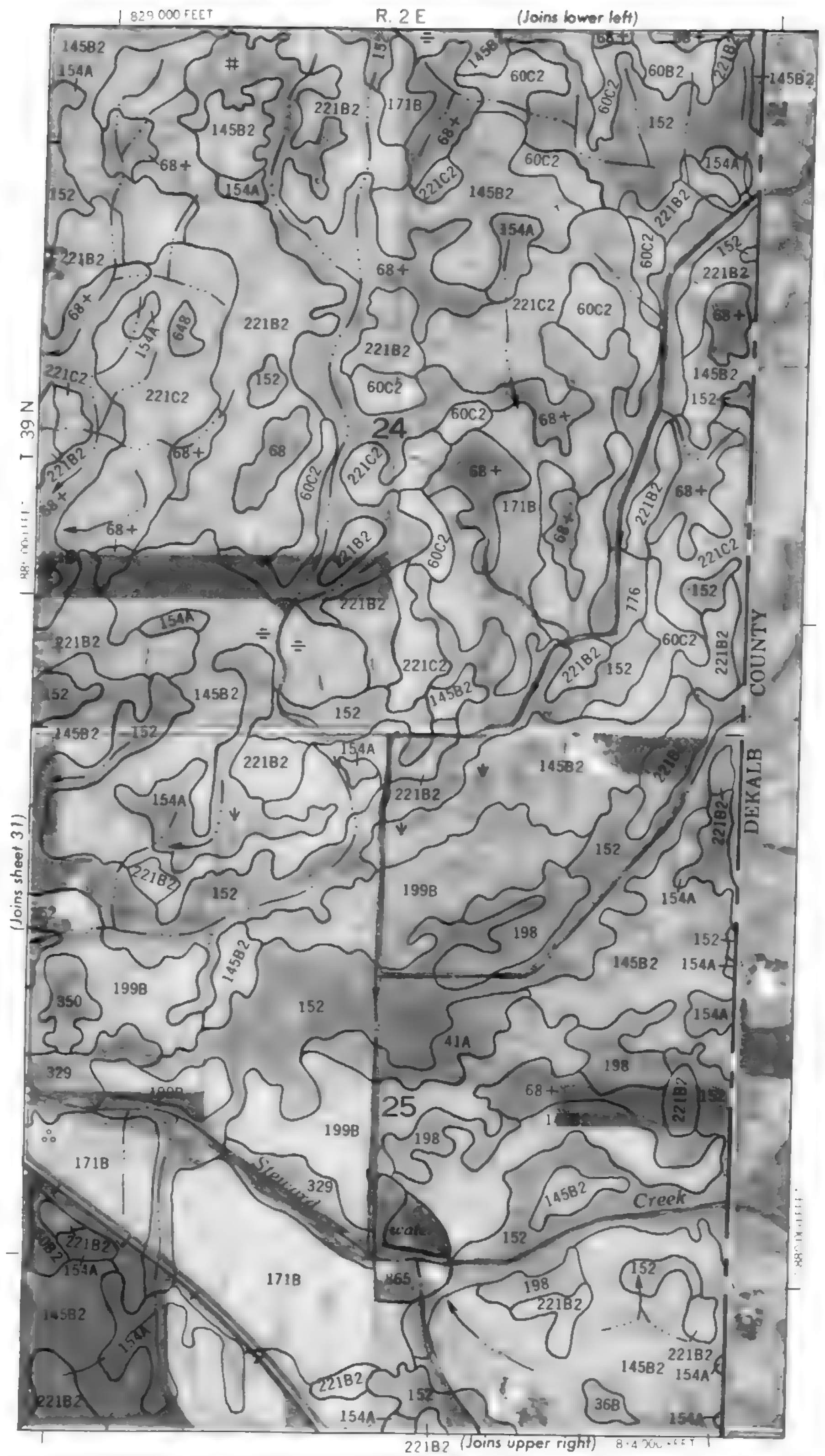
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



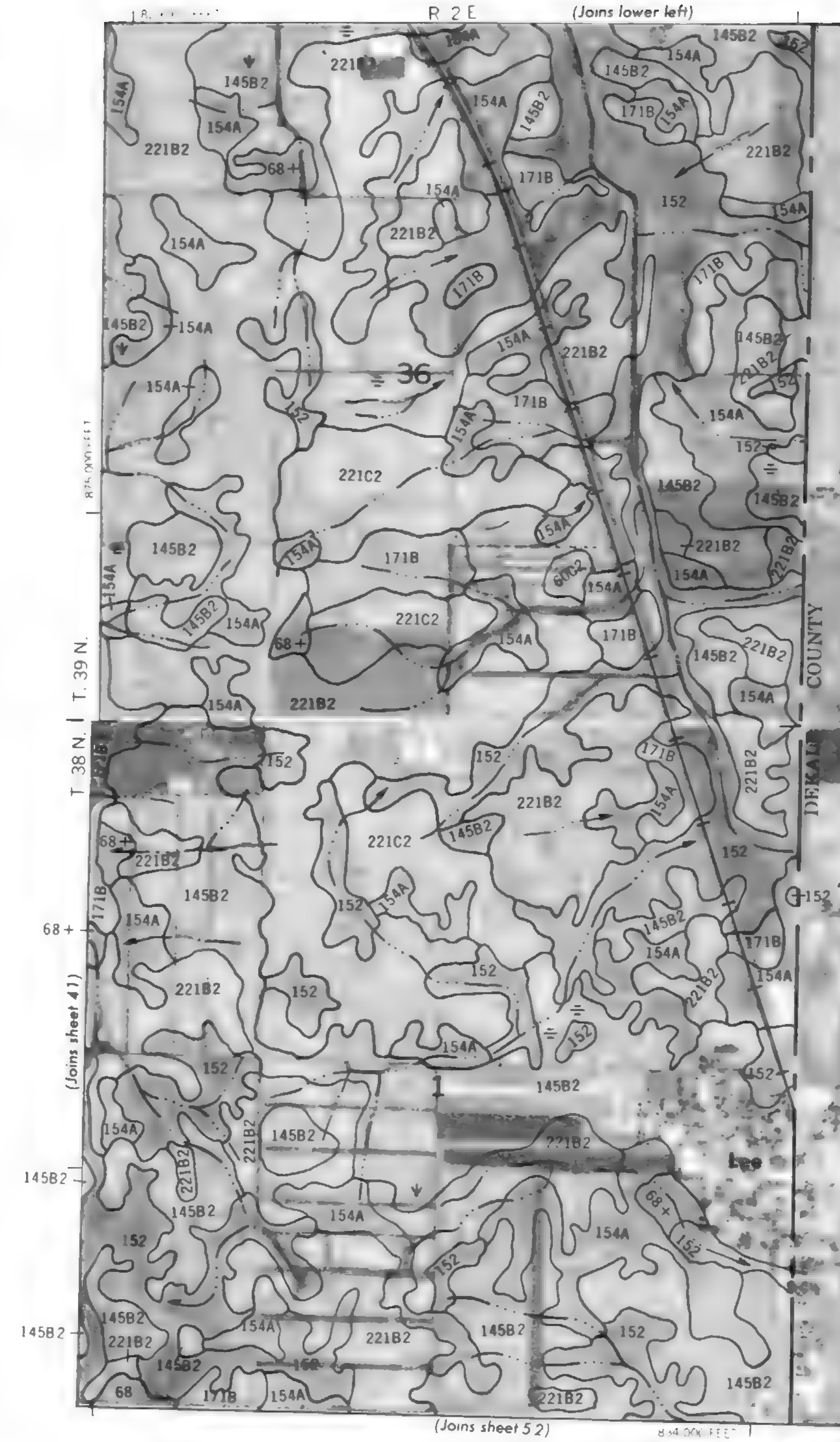
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


N
(Joins sheet 10)
R 2 E.
T. 39 N.
(Joins sheet 19)
(Joins sheet 21)
(Joins sheet 31)
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
1/4
1/2
3/4
1
8
9
10
11
14
15
16
17
PROPOSED
Steward

INSET A

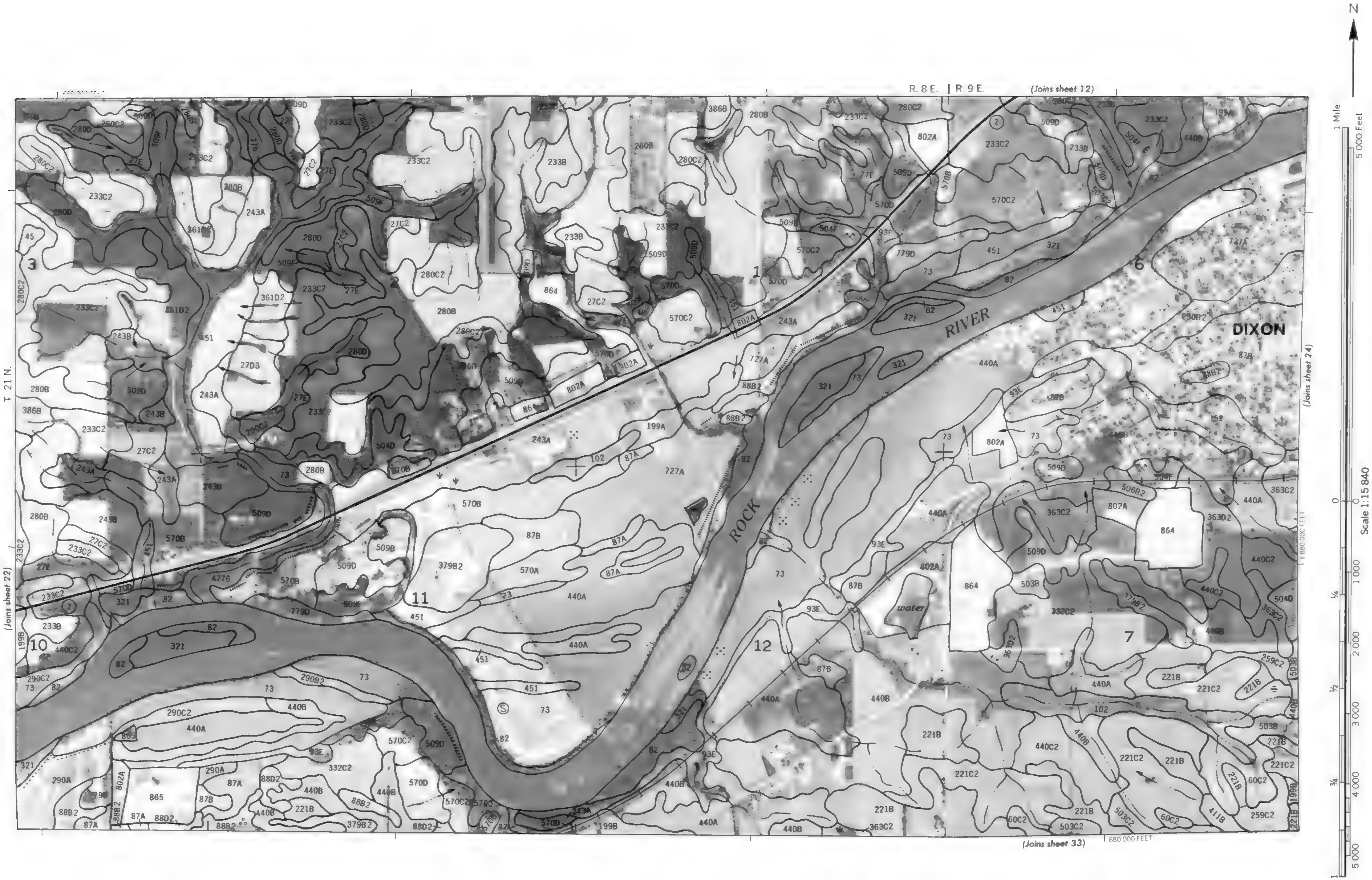


INSET B



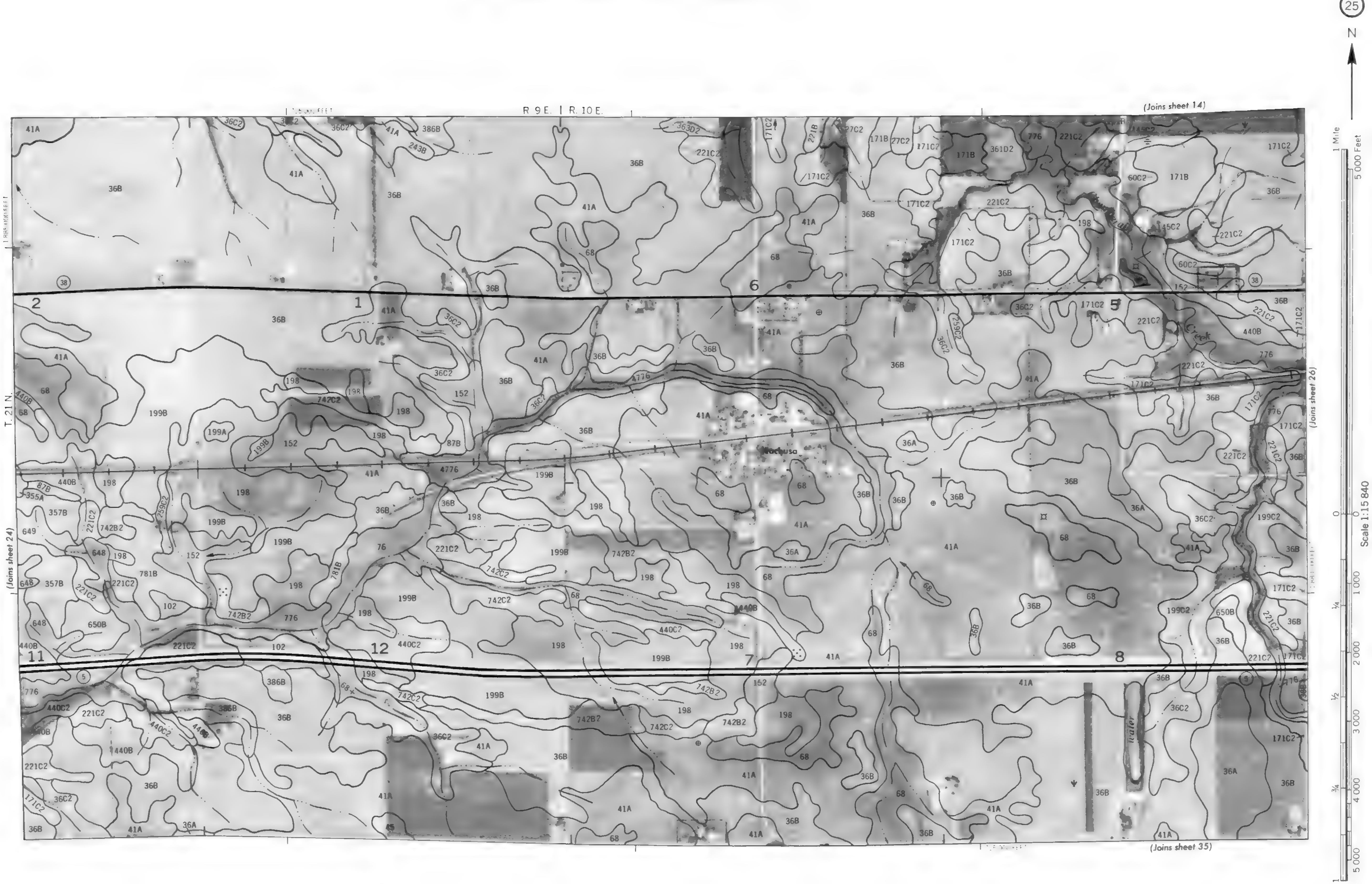
22

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



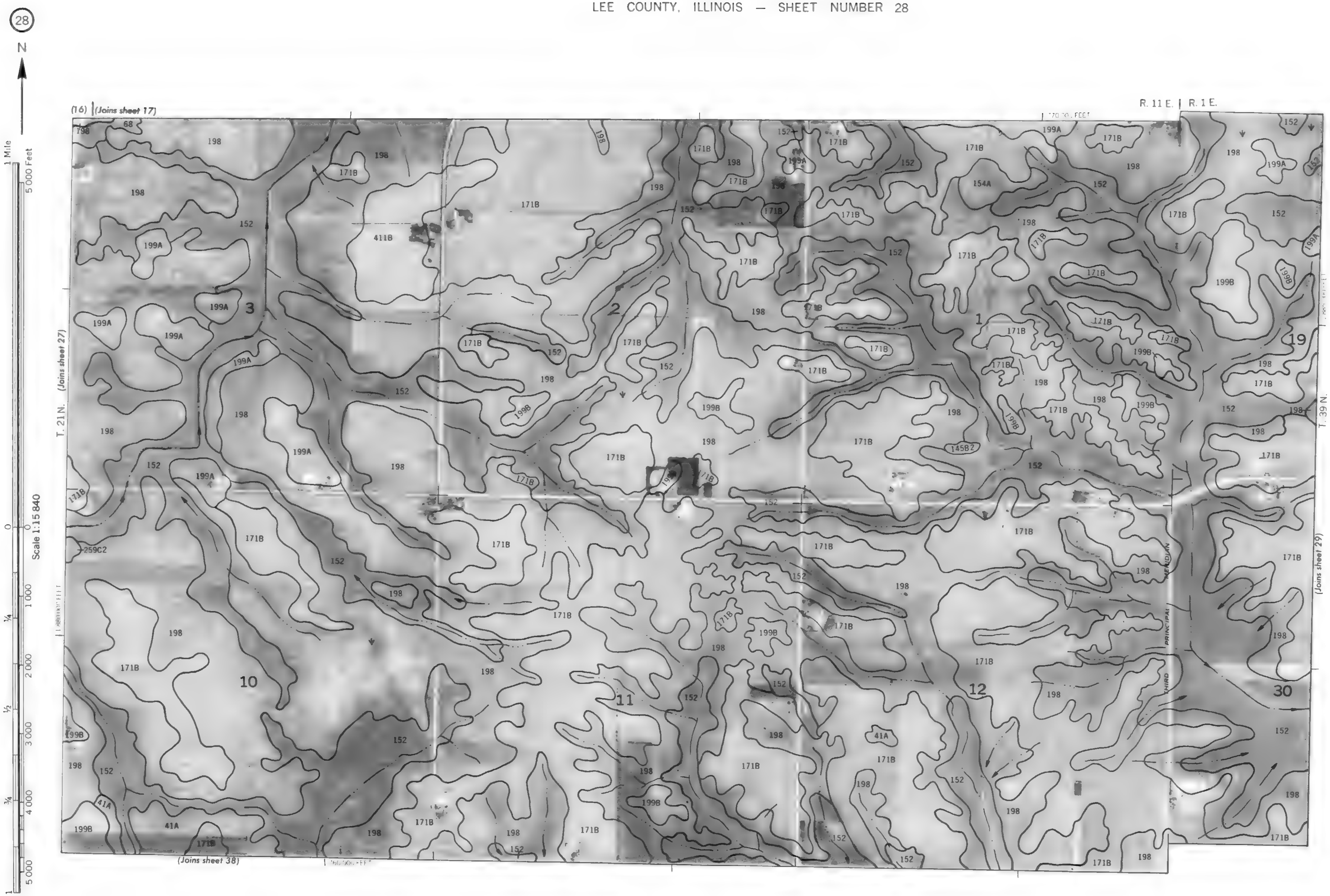
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


25
N
R. 9 E. | R. 10 E.
T. 21 N.
(Joins sheet 14)
(Joins sheet 26)
(Joins sheet 35)
(Joins sheet 24)
Nachusa
Creek
water
Scale 1:15 840
1 Mile
5 000 Feet


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 15)
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 36)
R. 10 E.
T. 21 N.
735 000 FEET
1 885 000 FEET
Franklin Grove
CEMETERY
Franklin Creek
water

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

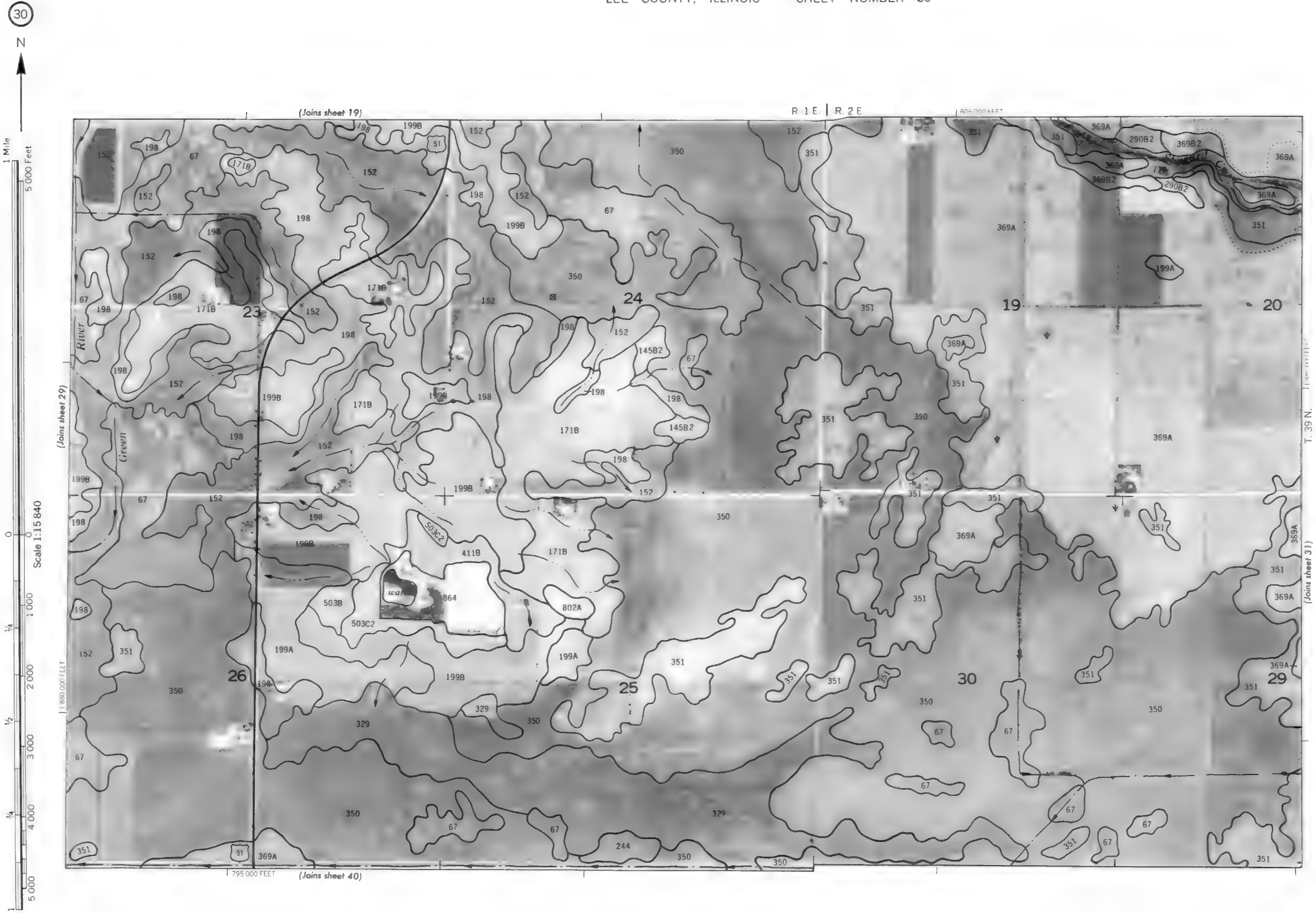


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

29

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LEE COUNTY, ILLINOIS — SHEET NUMBER 30

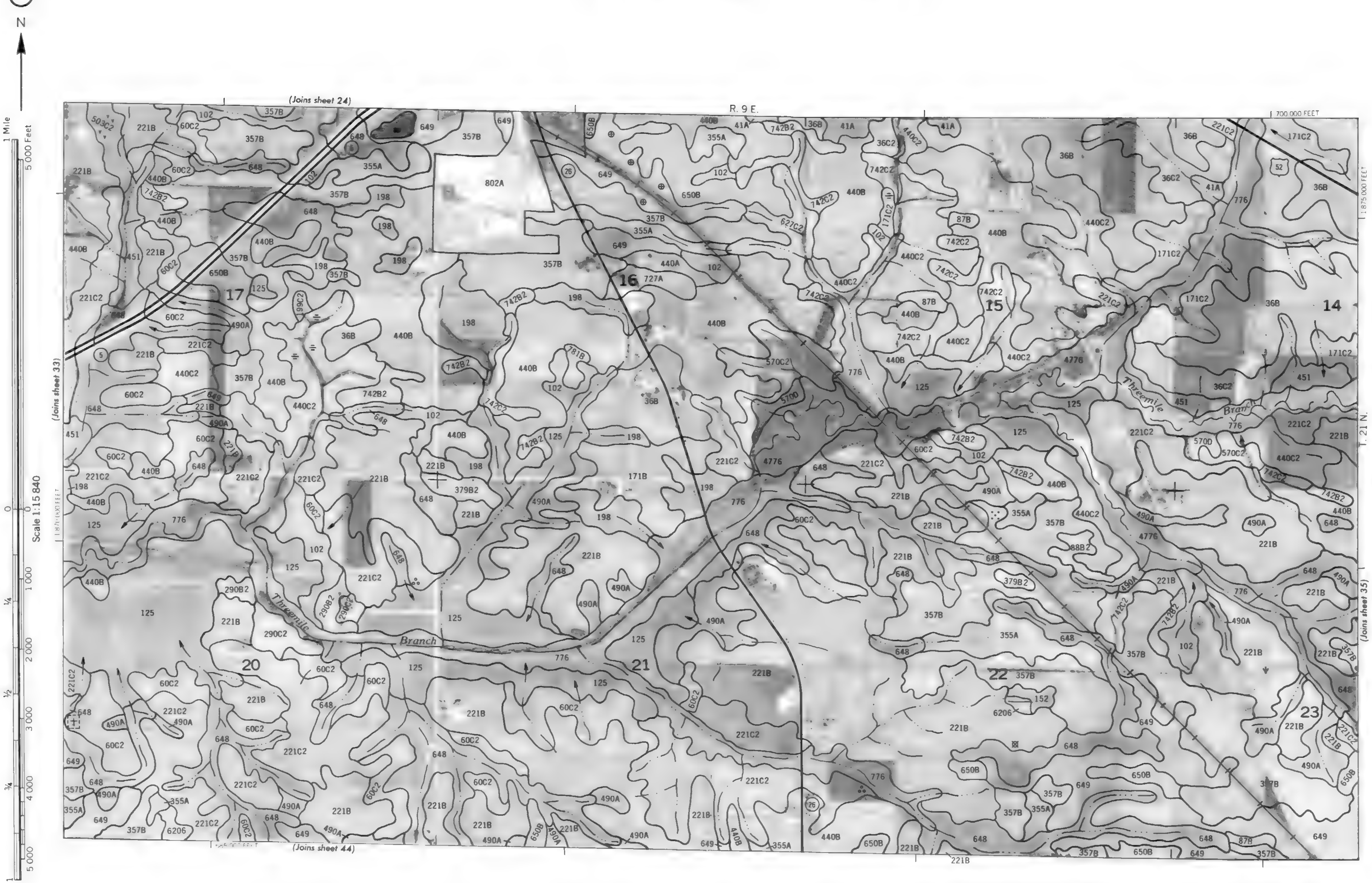


(31)

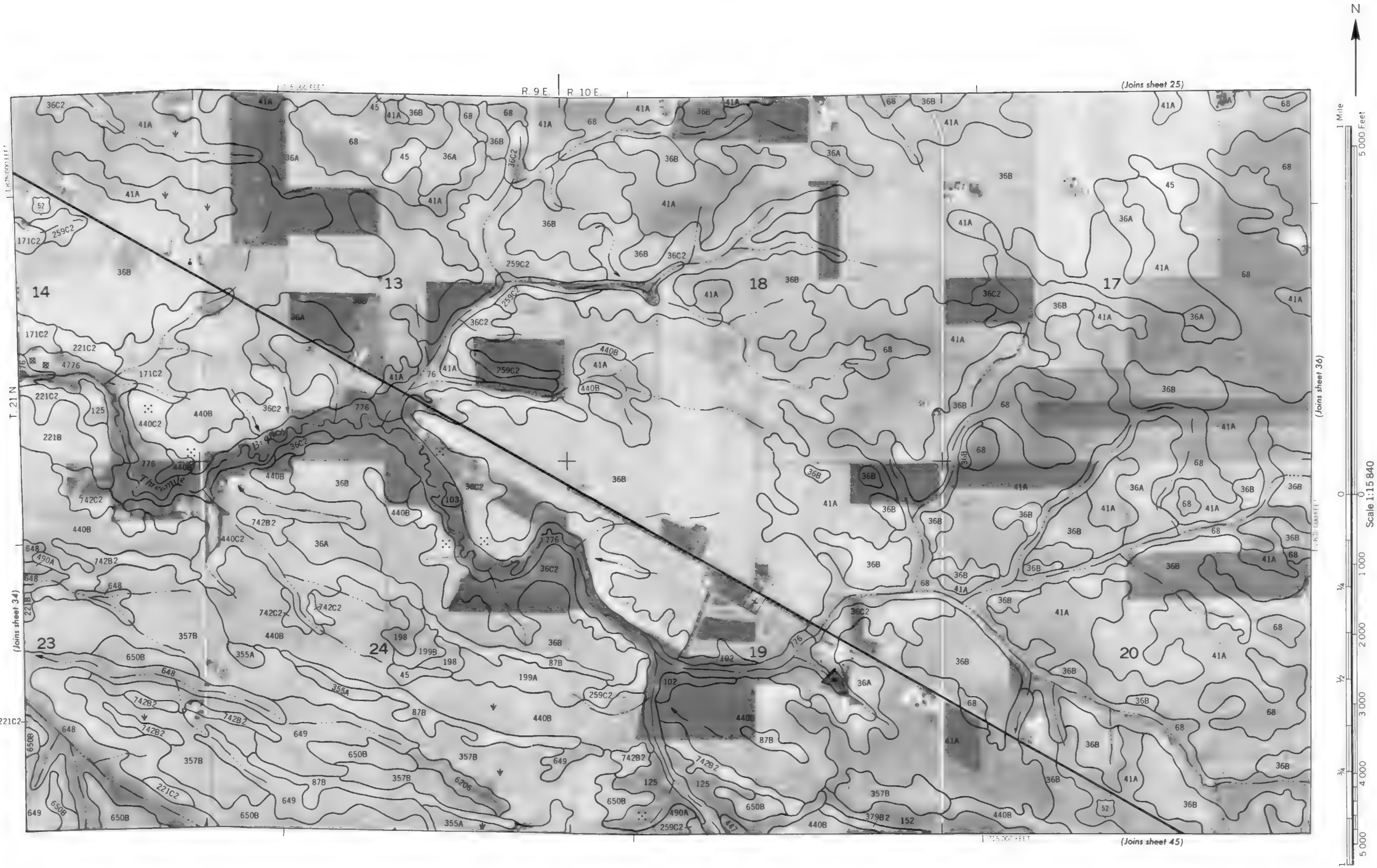
R. 2 E.
(Joins sheet 20)
(Joins sheet 30)
(Joins inset A, sheet 21)
(Joins sheet 41)
T. 39 N.
Steward Creek
water
N
1 Mile
5 000 Feet
Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


33
N
(Joins sheet 23)
(Joins sheet 32)
(Joins sheet 34)
(Joins sheet 43)
R. 8 E. | R. 9 E.
T. 21 N.
15
14
13
18
22
23
24
19
Threemile
Branch
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1 000
2 000
3 000
4 000
5 000



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



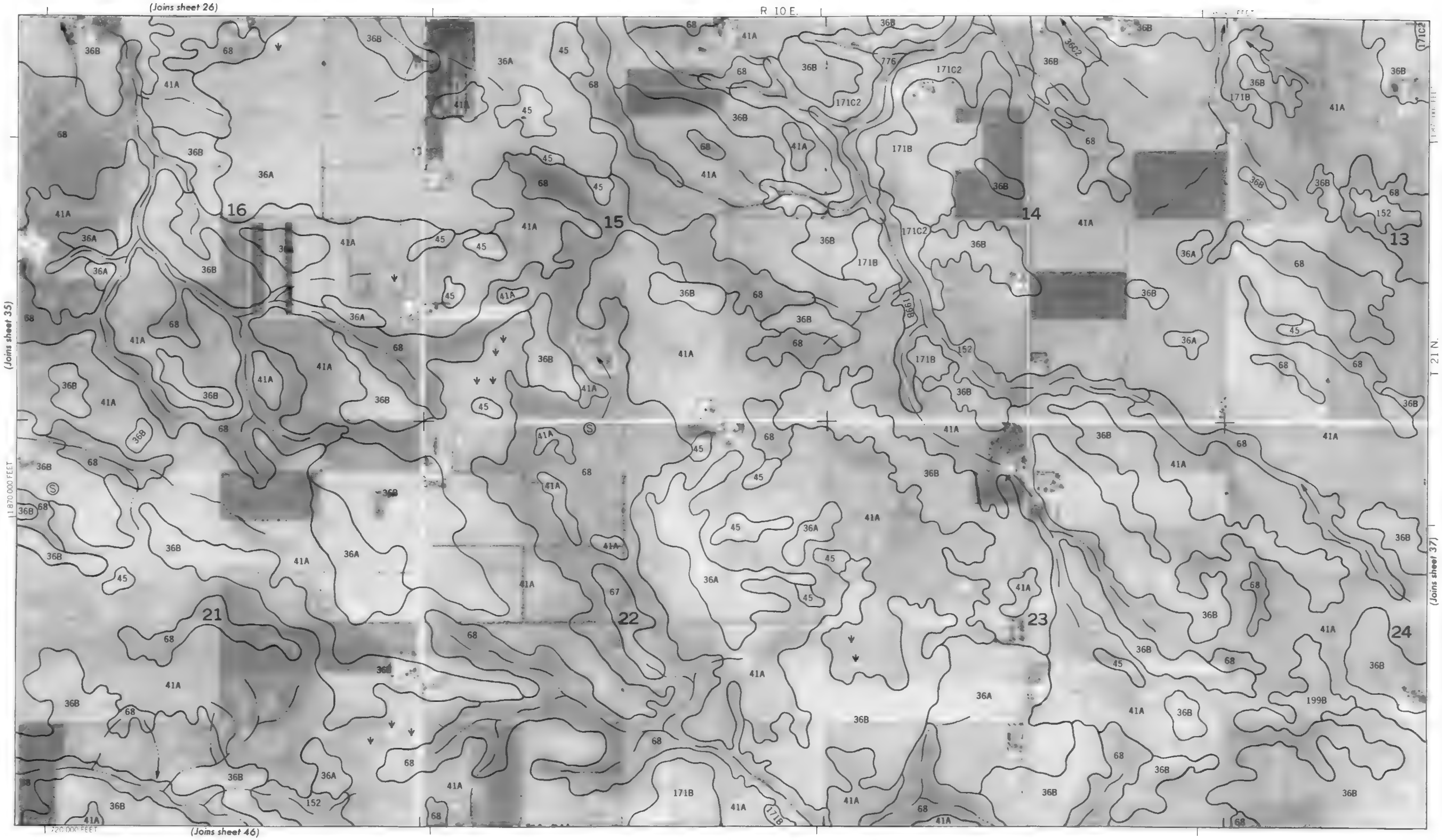
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

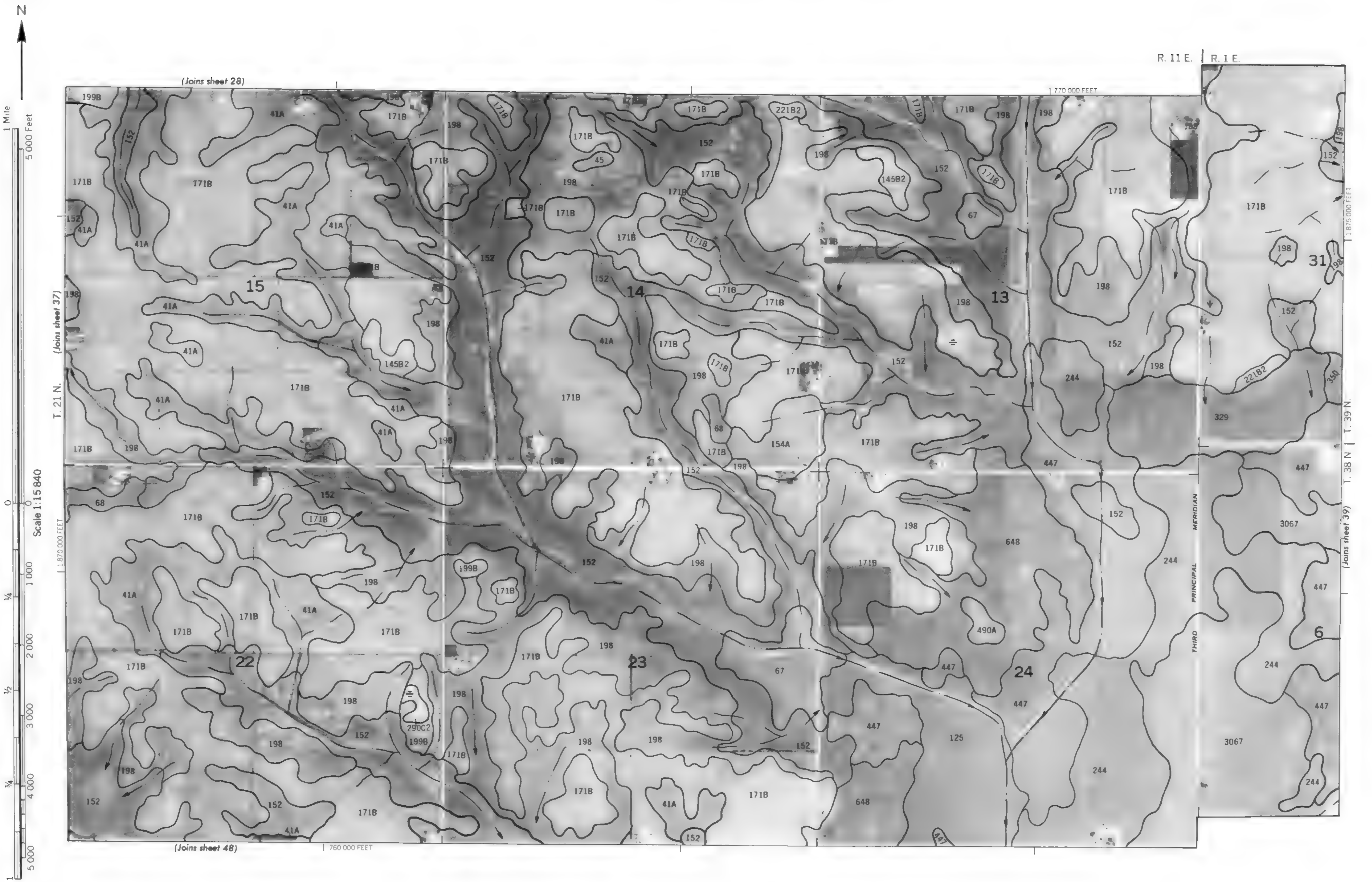
5 000 Feet

Scale 1:15 840

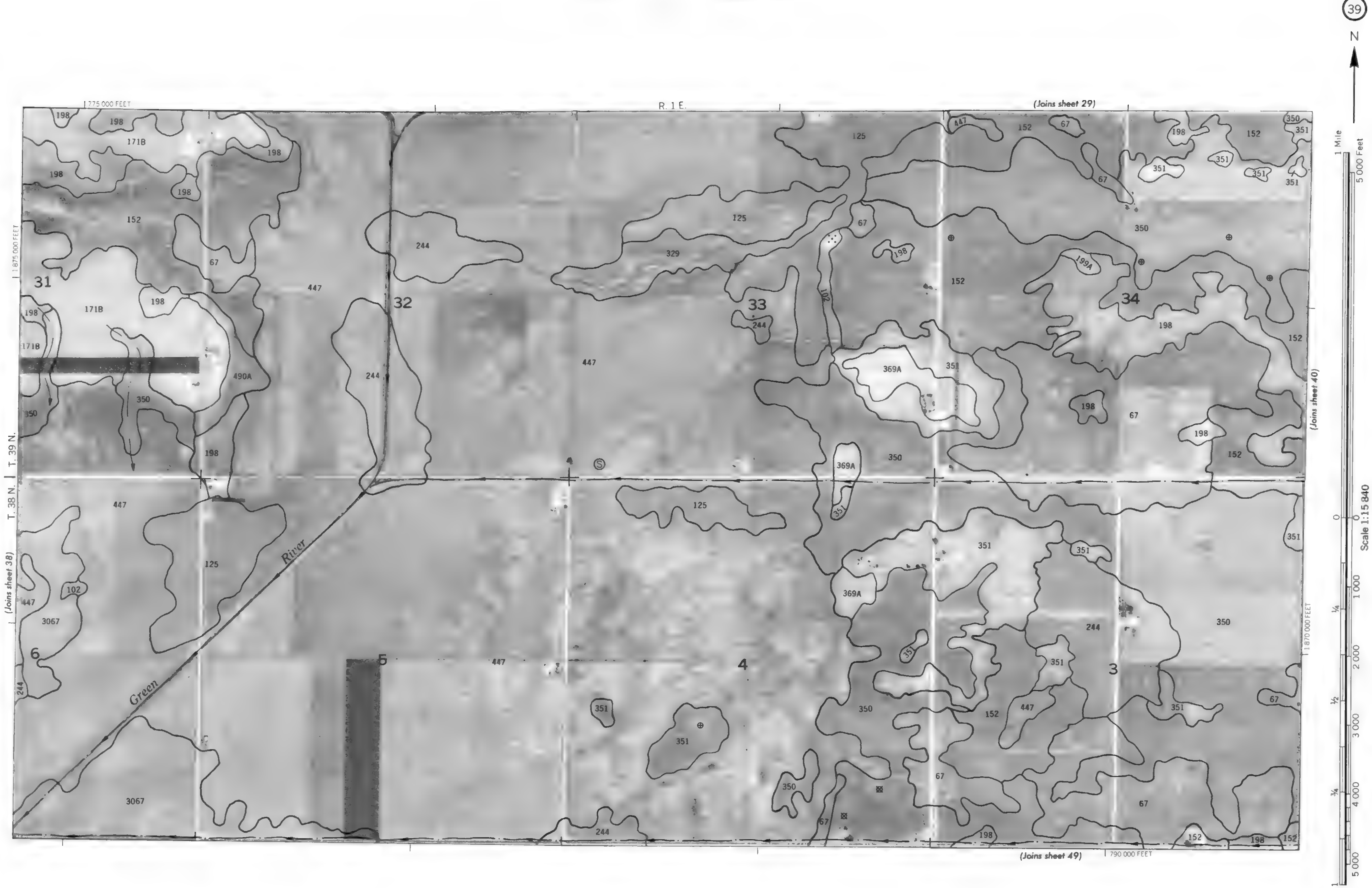


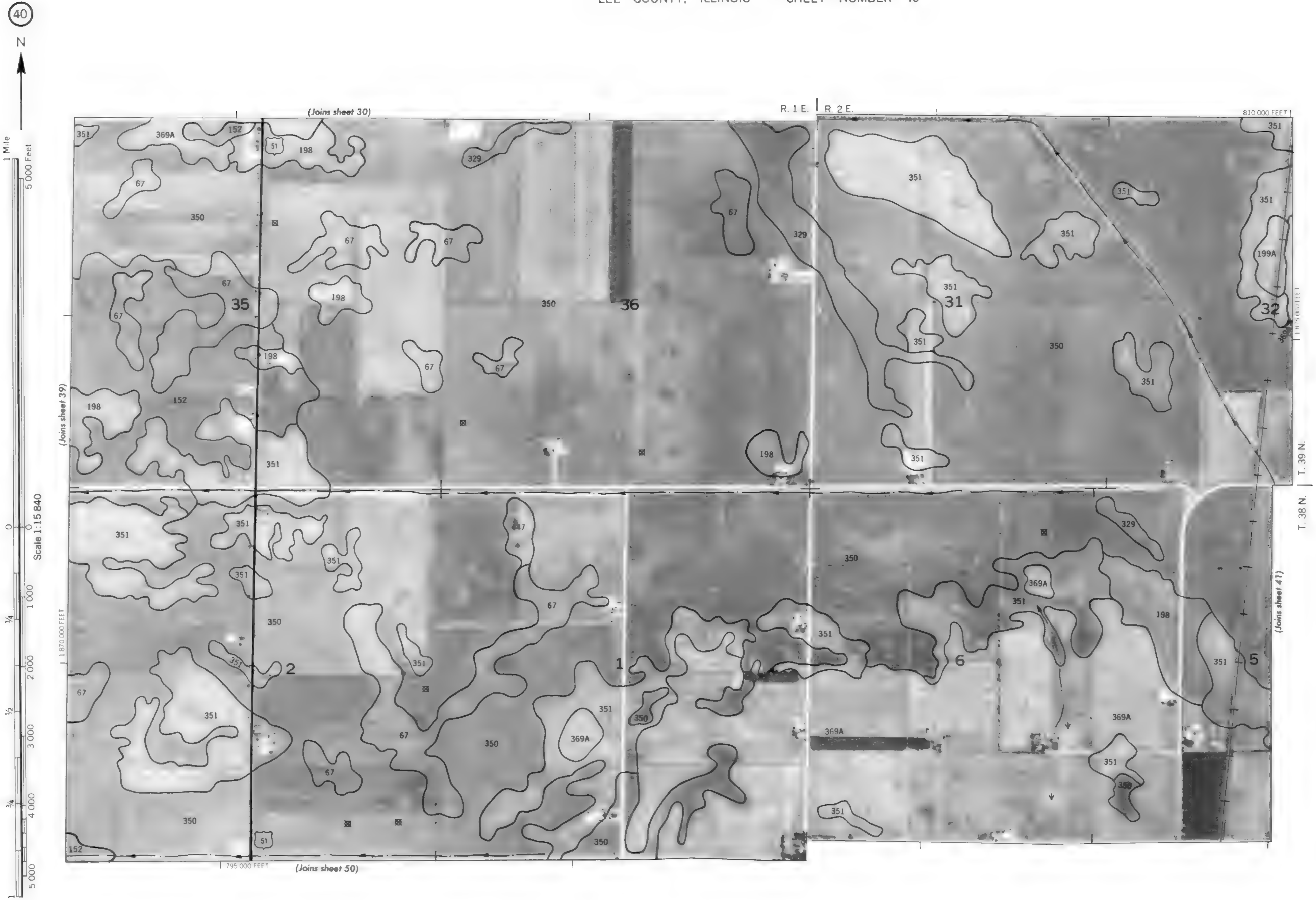
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

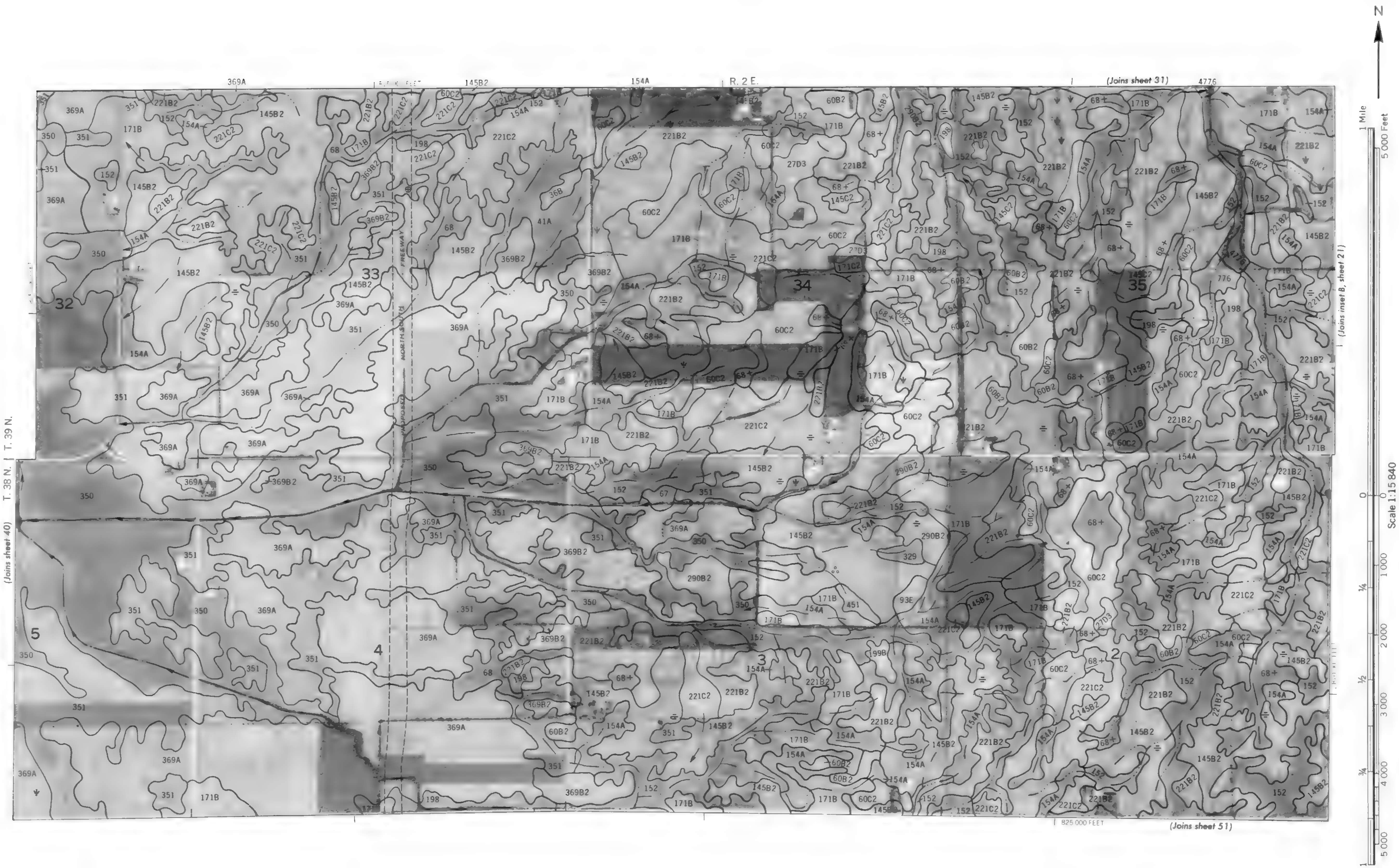


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


39
N
R. 1 E.
(Joins sheet 29)
(Joins sheet 40)
(Joins sheet 38)
(Joins sheet 49)
T. 39 N.
T. 38 N.
Green River
31
32
33
34
6
5
4
3
Scale 1:15 840
1 Mile
5 000 Feet



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

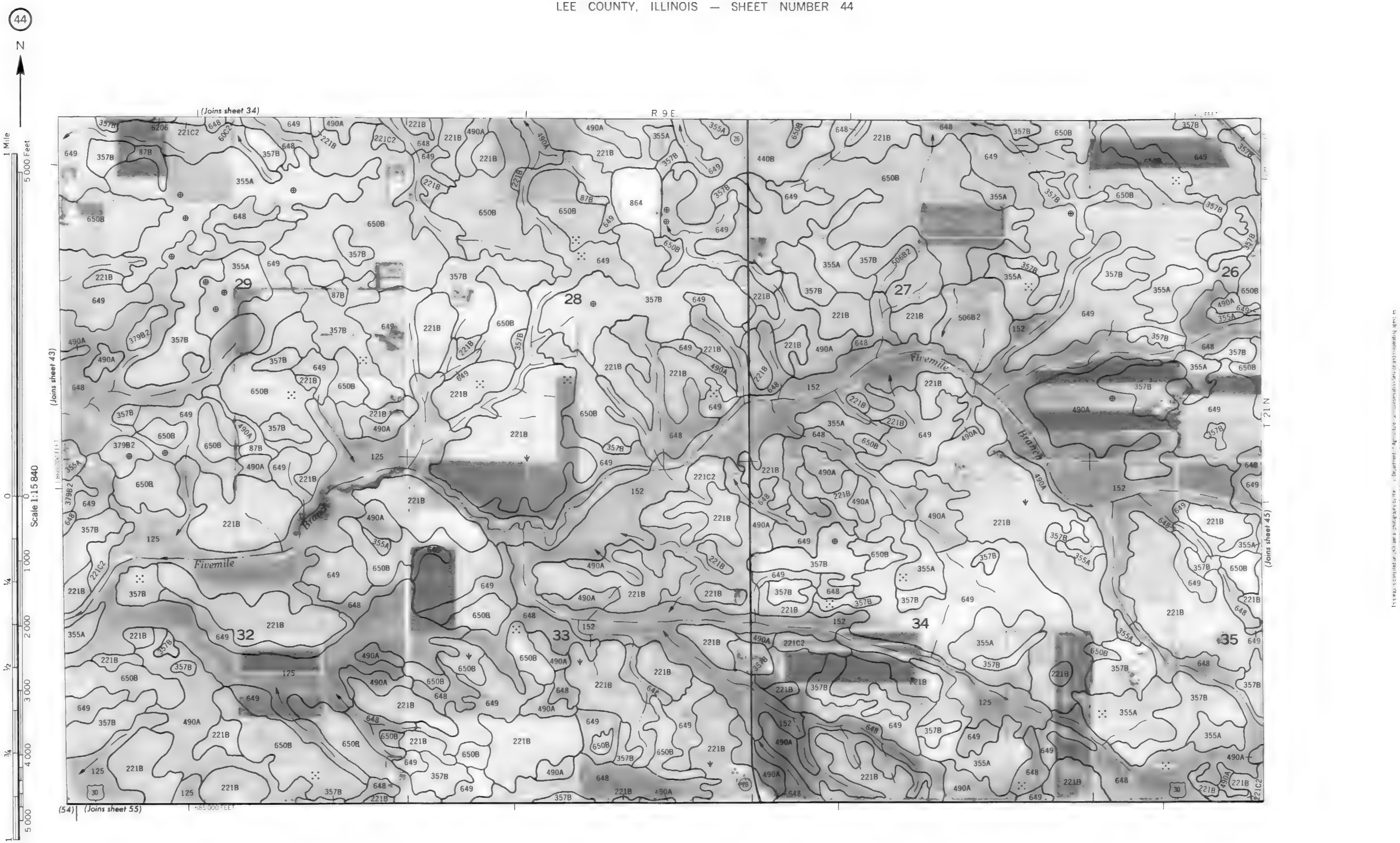


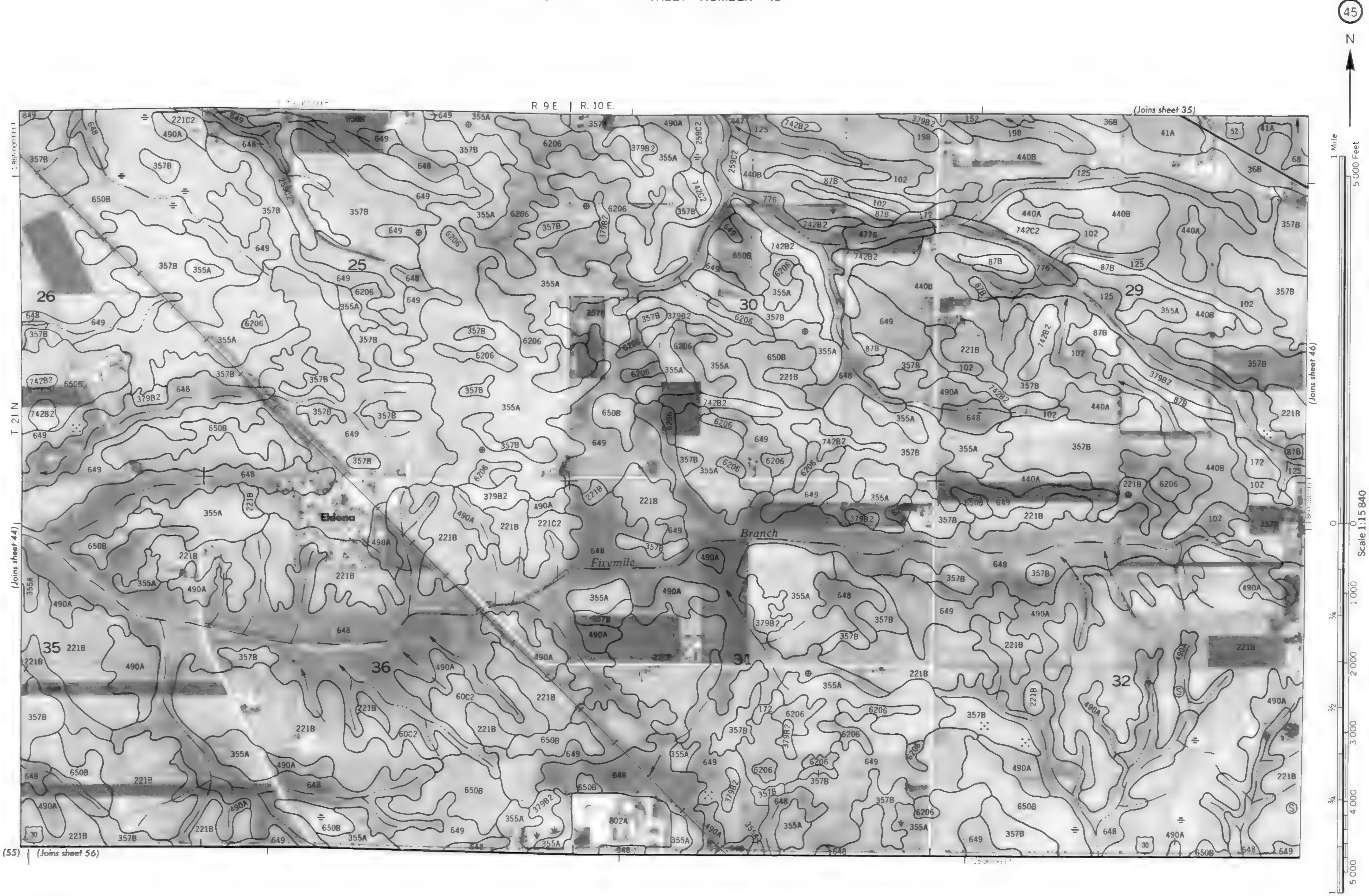
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

43

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


44
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 34)
R 9 E
(Joins sheet 43)
(Joins sheet 45)
T 21 N
(54)
(Joins sheet 55)
29
28
27
26
32
33
34
35
Fivemile
Branch
Fivemile
Branch
30
26
864
152
125
221B
649
650B
357B
355A
490A
648
221C2
87B
379B2
506B2
440B



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

46


N
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
(Joins sheet 36)
R 10 E.
T. 21 N.
(Joins sheet 45)
(Joins sheet 47)
(Joins sheet 57)
1 865 000 FEET
1 860 000 FEET
28
27
26
25
33
34
35
36
52
30

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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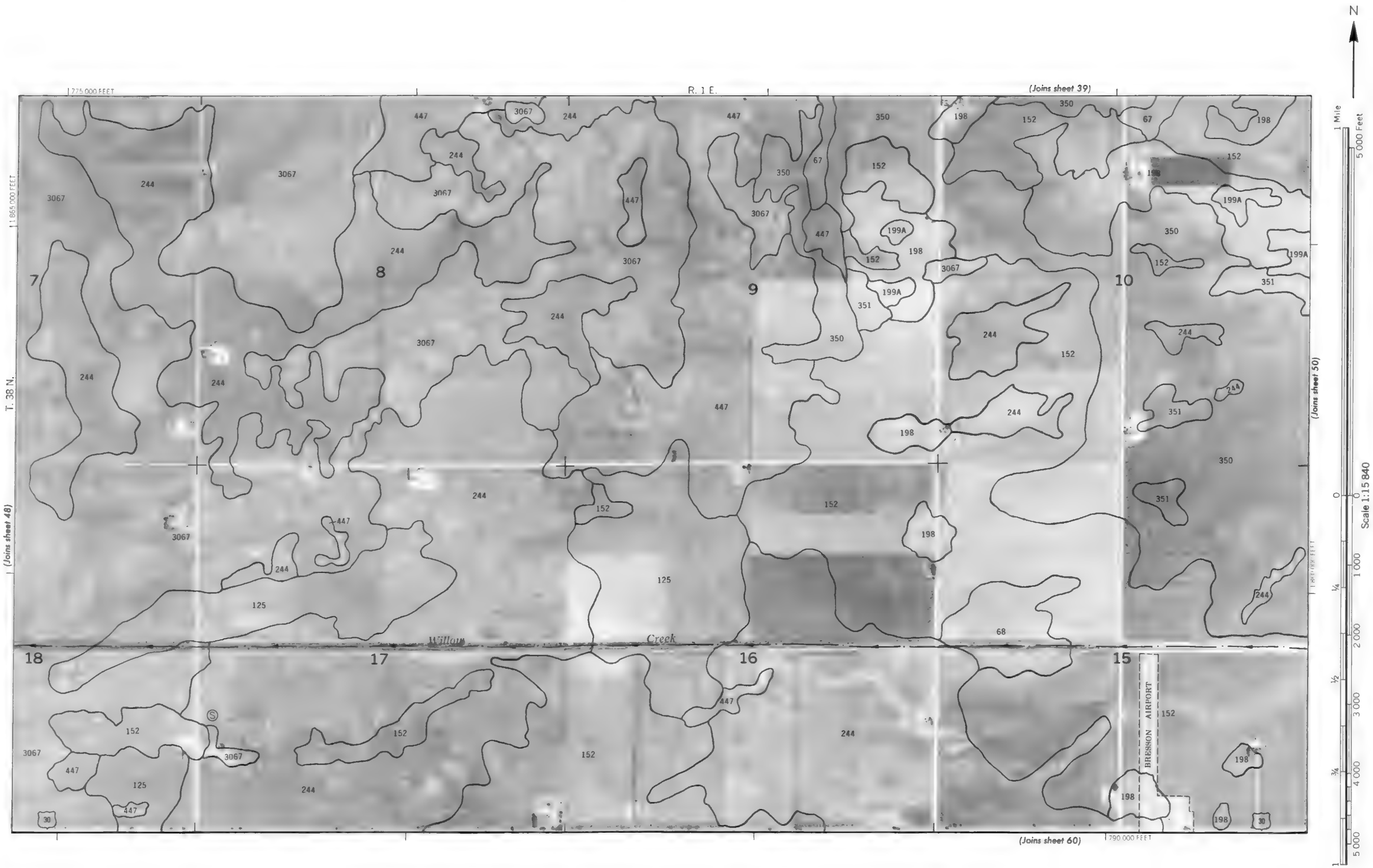
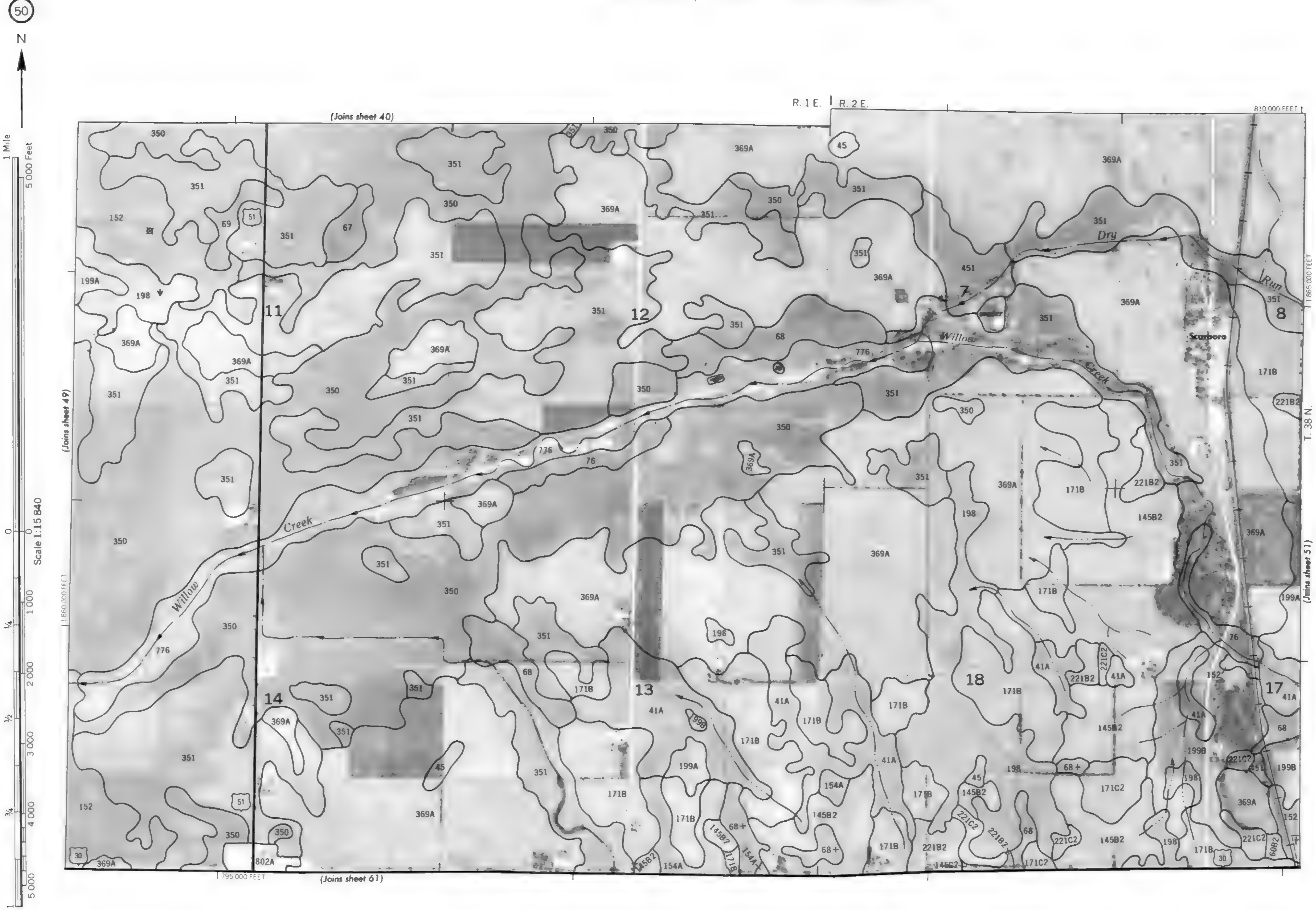
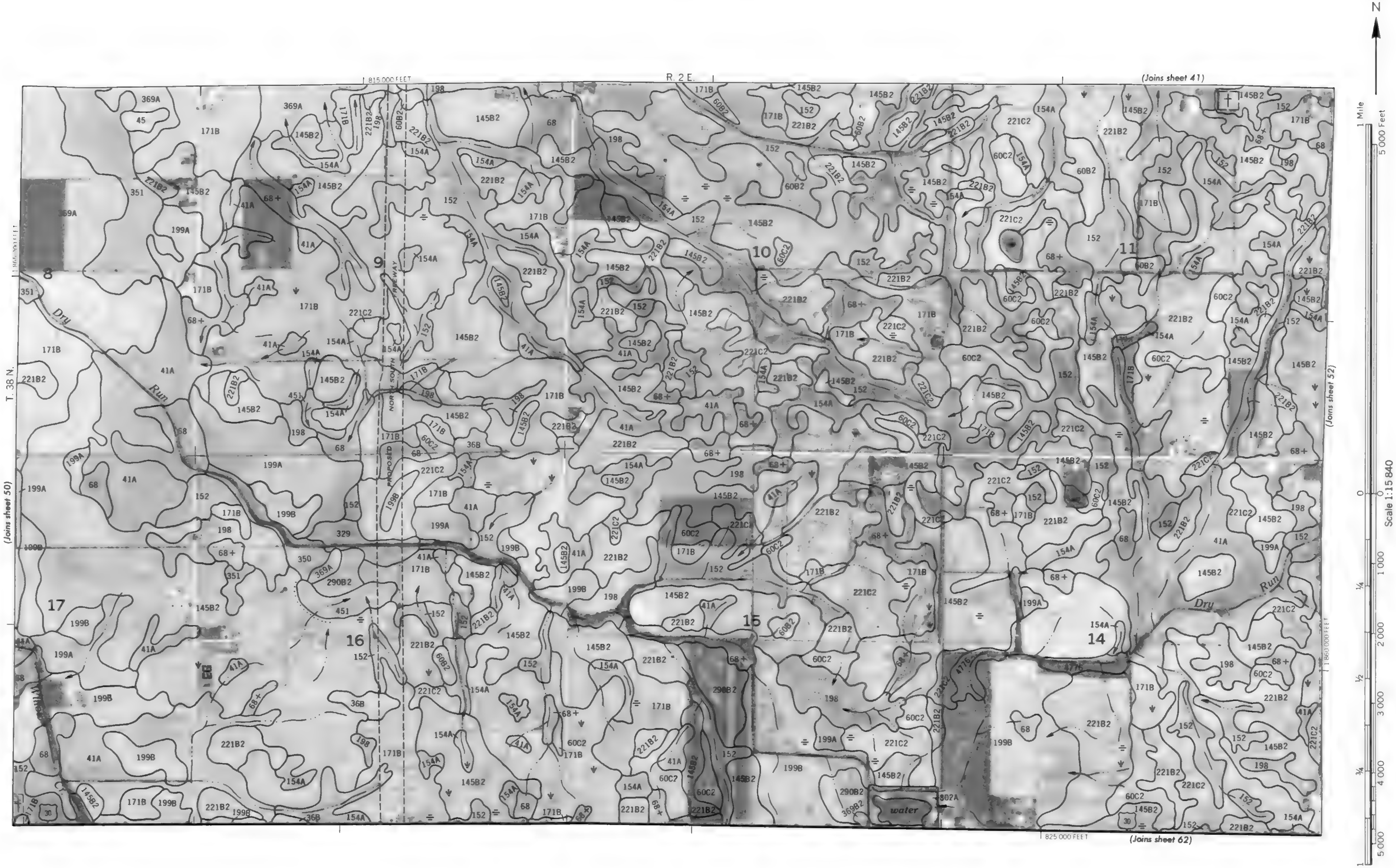
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



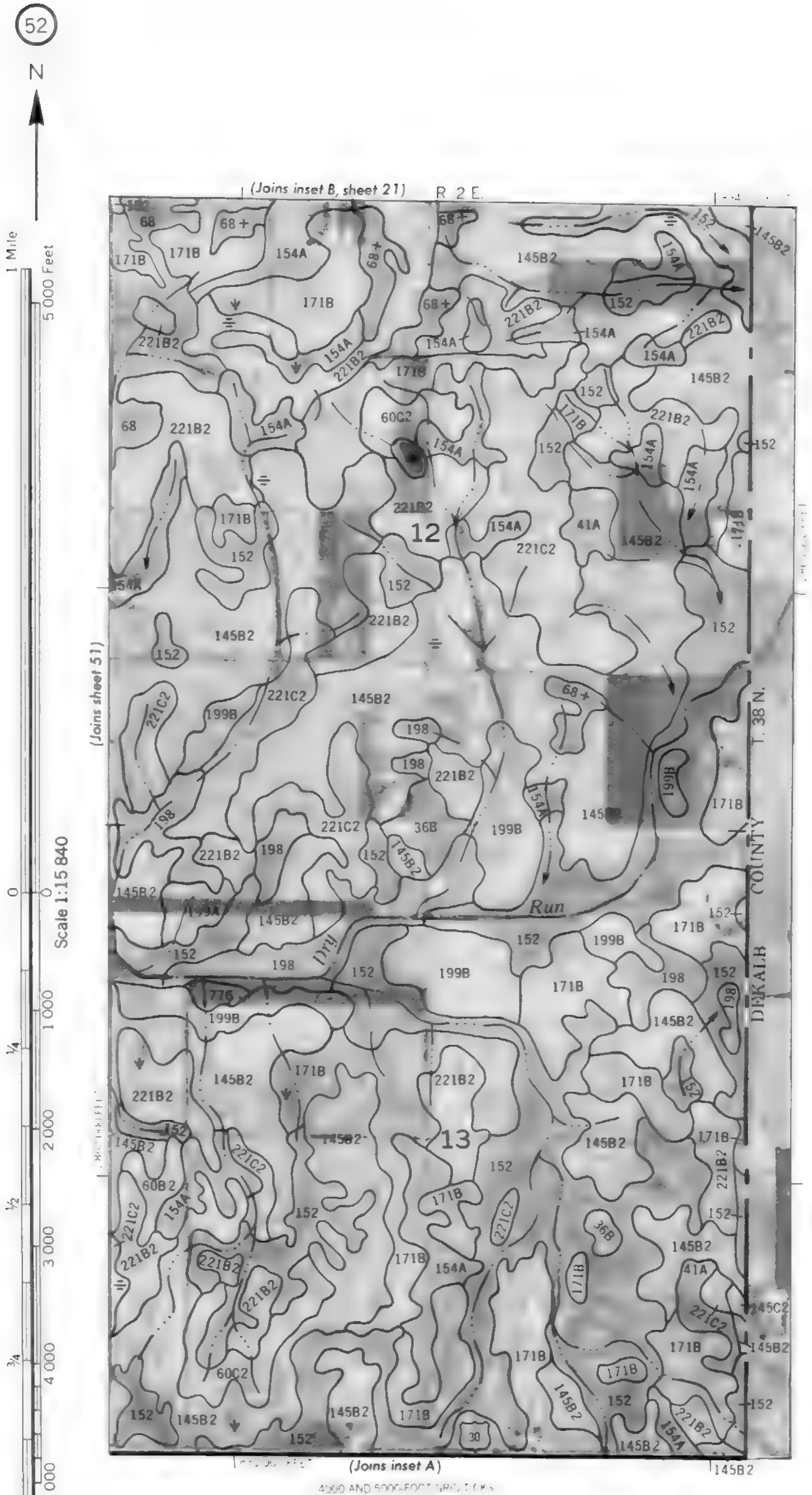
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



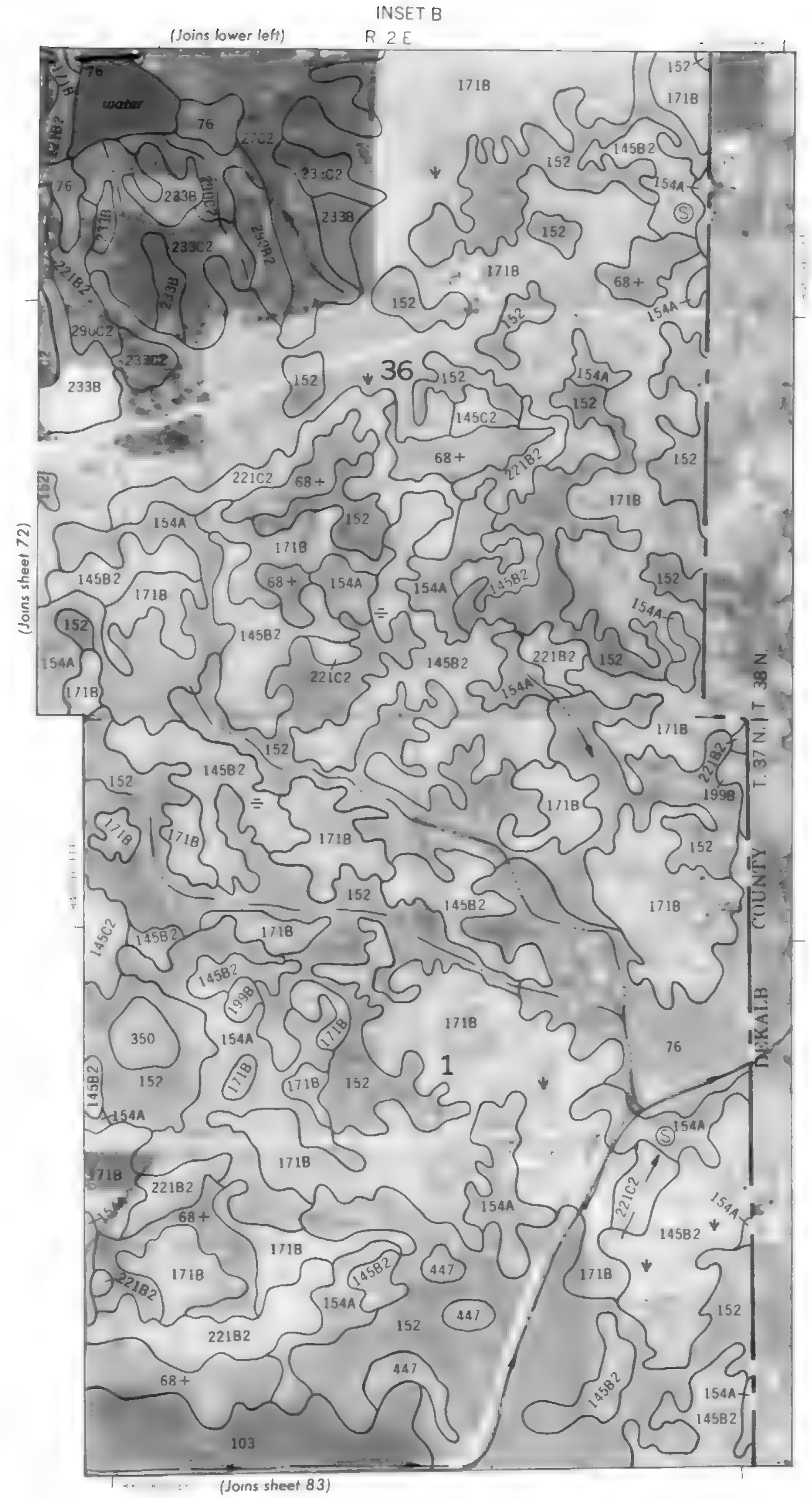
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


52
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins inset B, sheet 21)
R. 2 E.
(Joins sheet 51)
T. 38 N.
DEKALB COUNTY
12
13
Run
(Joins inset A)


INSET A
(Joins lower left)
R. 2 E.
(Joins sheet 62)
24
25
38 N.
DEKALB COUNTY
(Joins inset B)

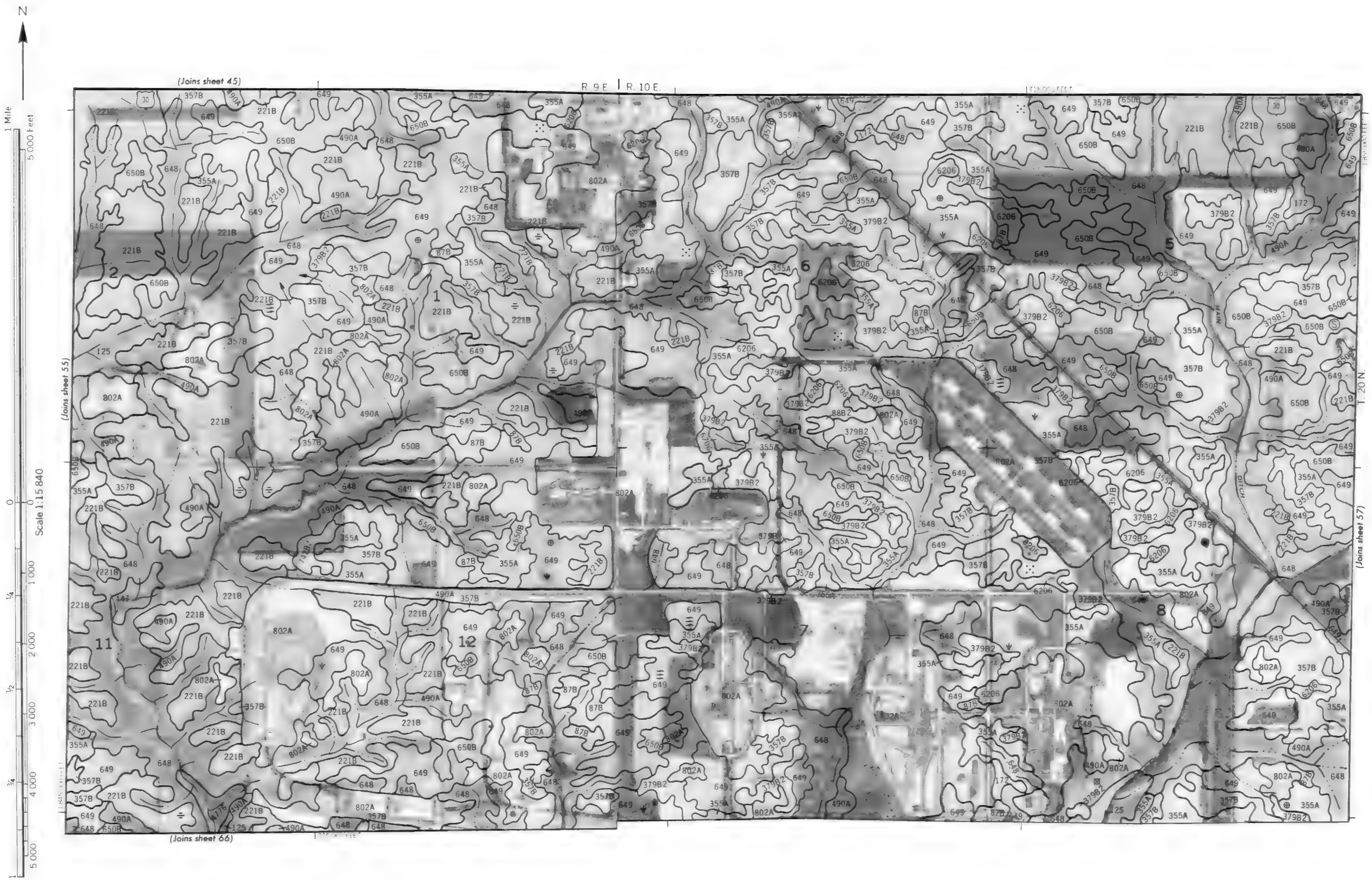

INSET B
(Joins lower left)
R. 2 E.
(Joins sheet 72)
water
36
1
T. 37 N. | T. 38 N.
DEKALB COUNTY
(Joins sheet 83)

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned


(Joins sheet 44)
(Joins sheet 65)
(Joins sheet 54)
(Joins sheet 56)
R 9 E.
T 20 N
N
Scale 1:15 840
1 Mile
5 000 Feet

56



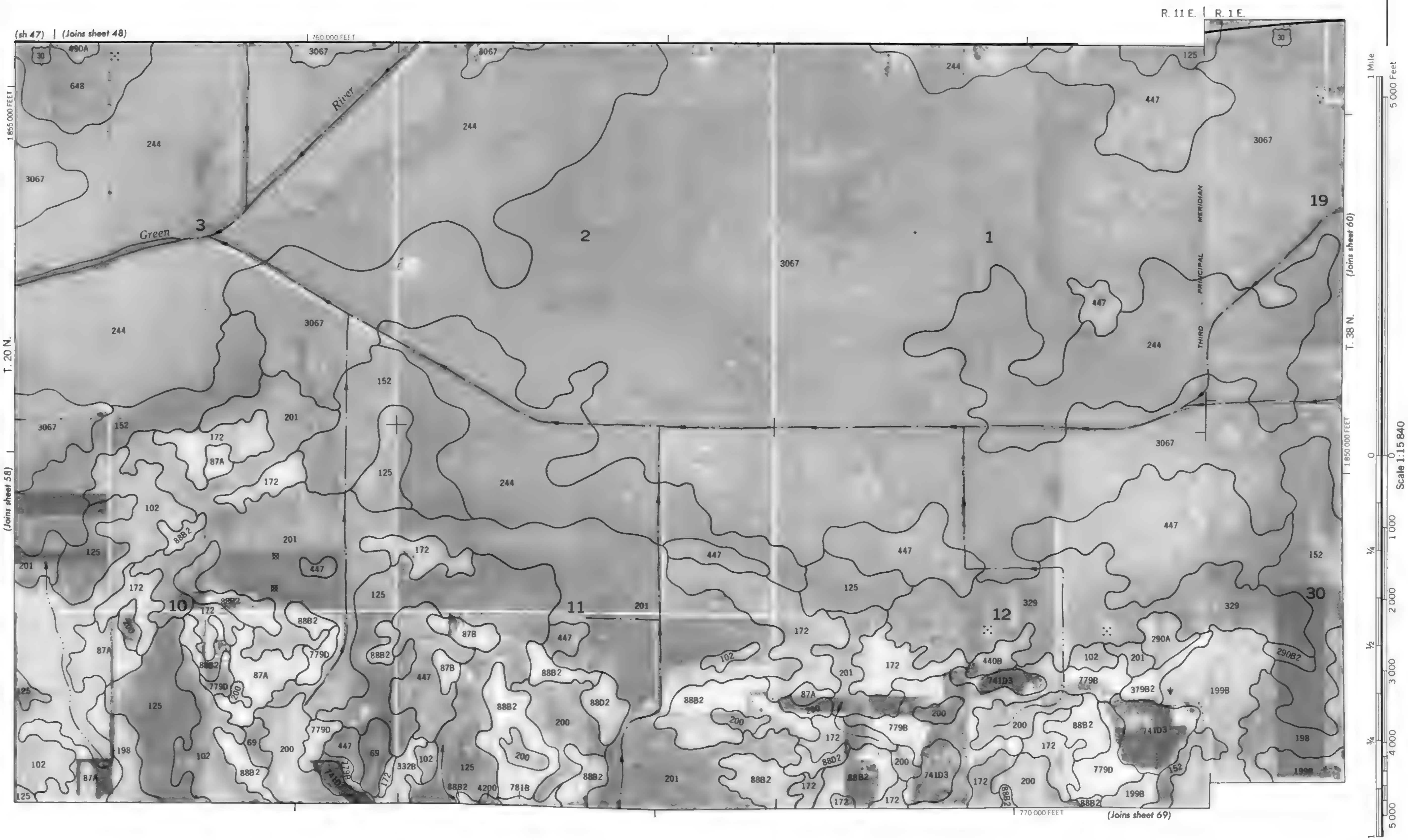
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

57

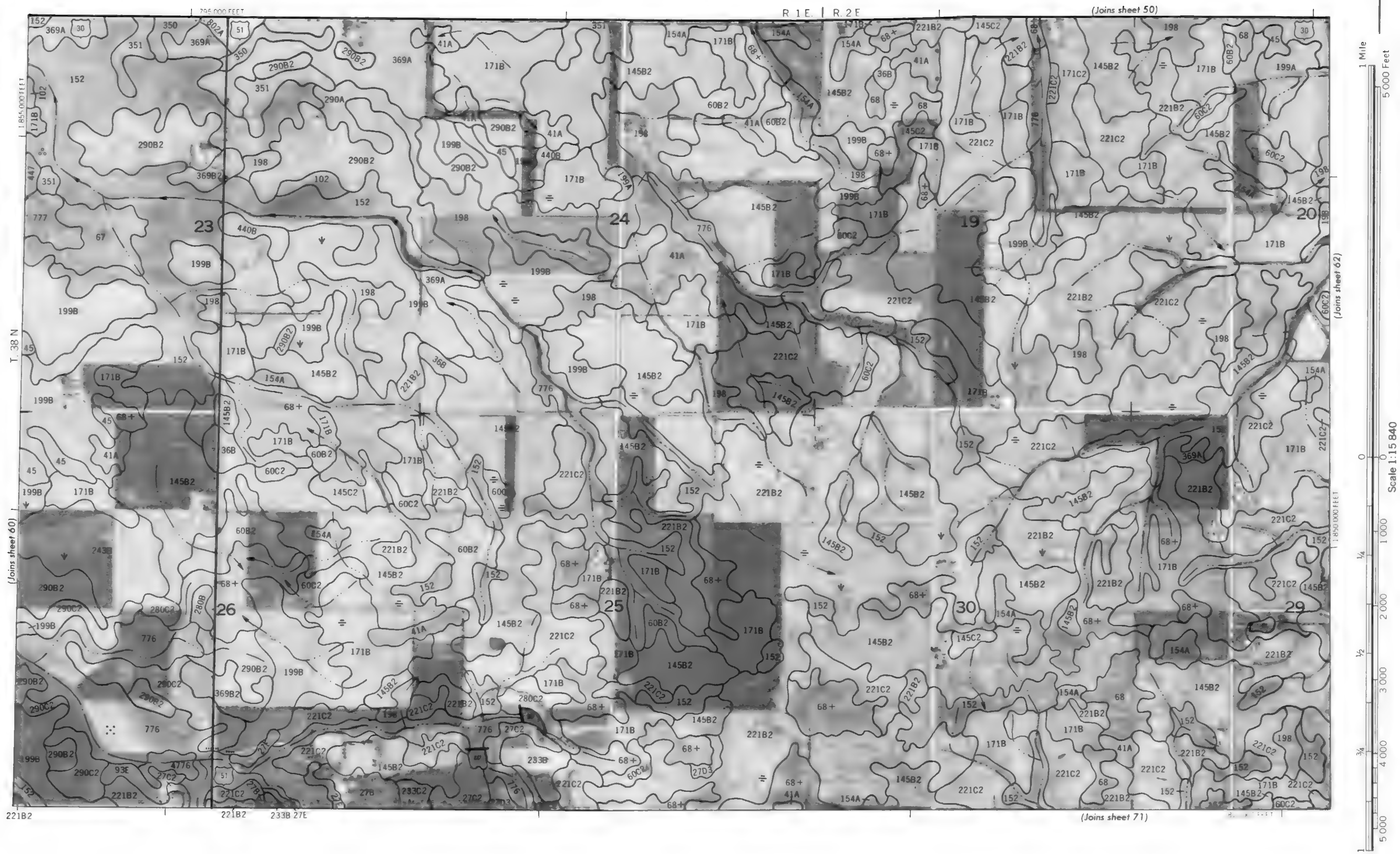

N
(Joins sheet 46)
R. 10 E.
T. 20 N.
(Joins sheet 56)
(Joins sheet 58)
(Joins sheet 67)
1 Mile
5 000 Feet
Scale 1:15 840

58

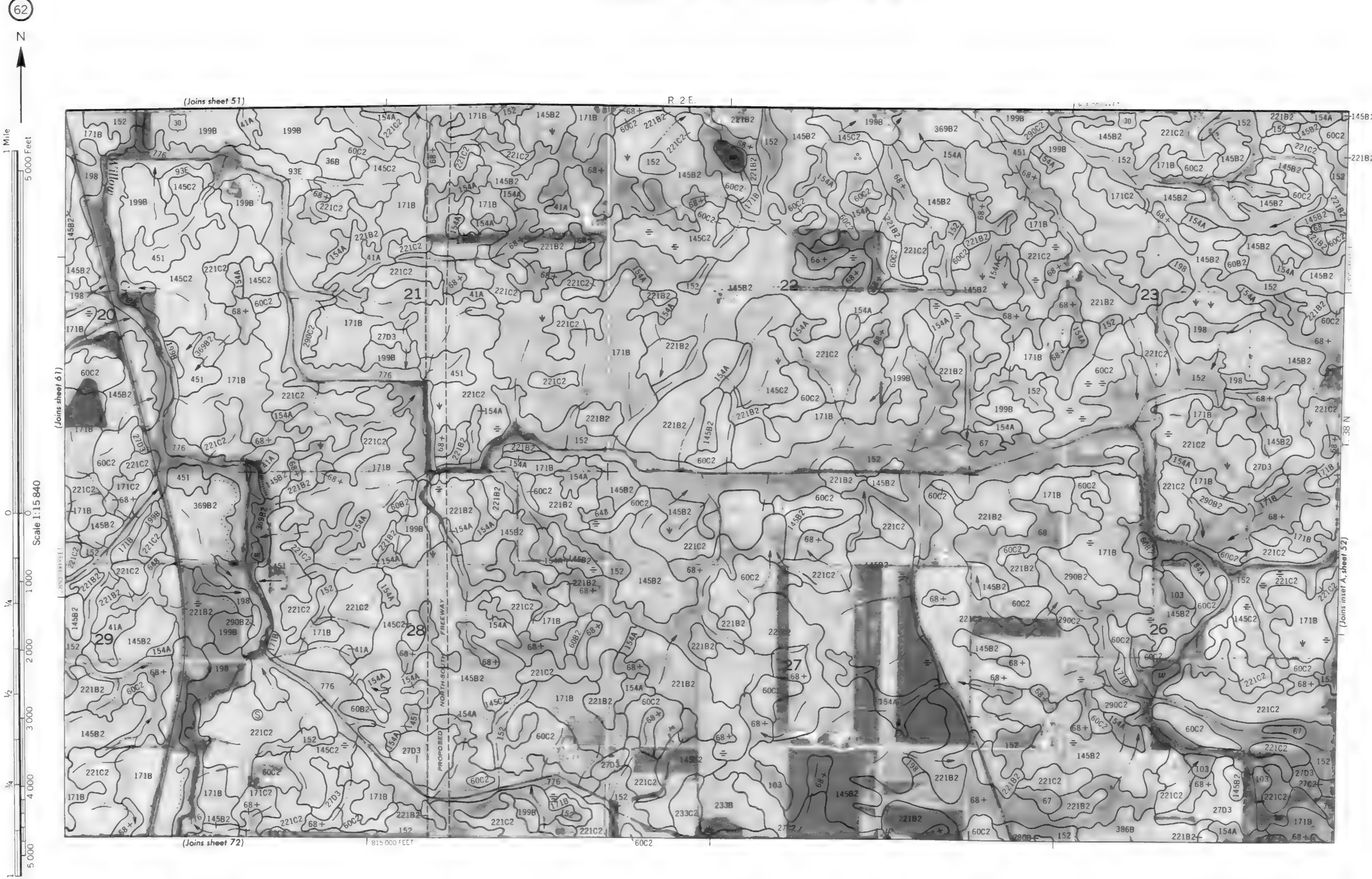

N
1 Mile
5 000 Feet
Scale 1:15 840
R. 10 E.
R. 11 E.
(Joins sheet 47)
(Joins sheet 57)
(Joins sheet 59)
(Joins sheet 68)
T. 20 N.
Lee Center
Green
River
1
4
5
6
7
8
9
12


N
R. 11 E.
R. 1 E.
(sh 47)
(Joins sheet 48)
(Joins sheet 58)
(Joins sheet 60)
(Joins sheet 69)
760 000 FEET
770 000 FEET
1 855 000 FEET
1 850 000 FEET
T. 20 N.
T. 38 N.
Green
River
THIRD PRINCIPAL MERIDIAN
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1
1000
2000
3000
4000
5000
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

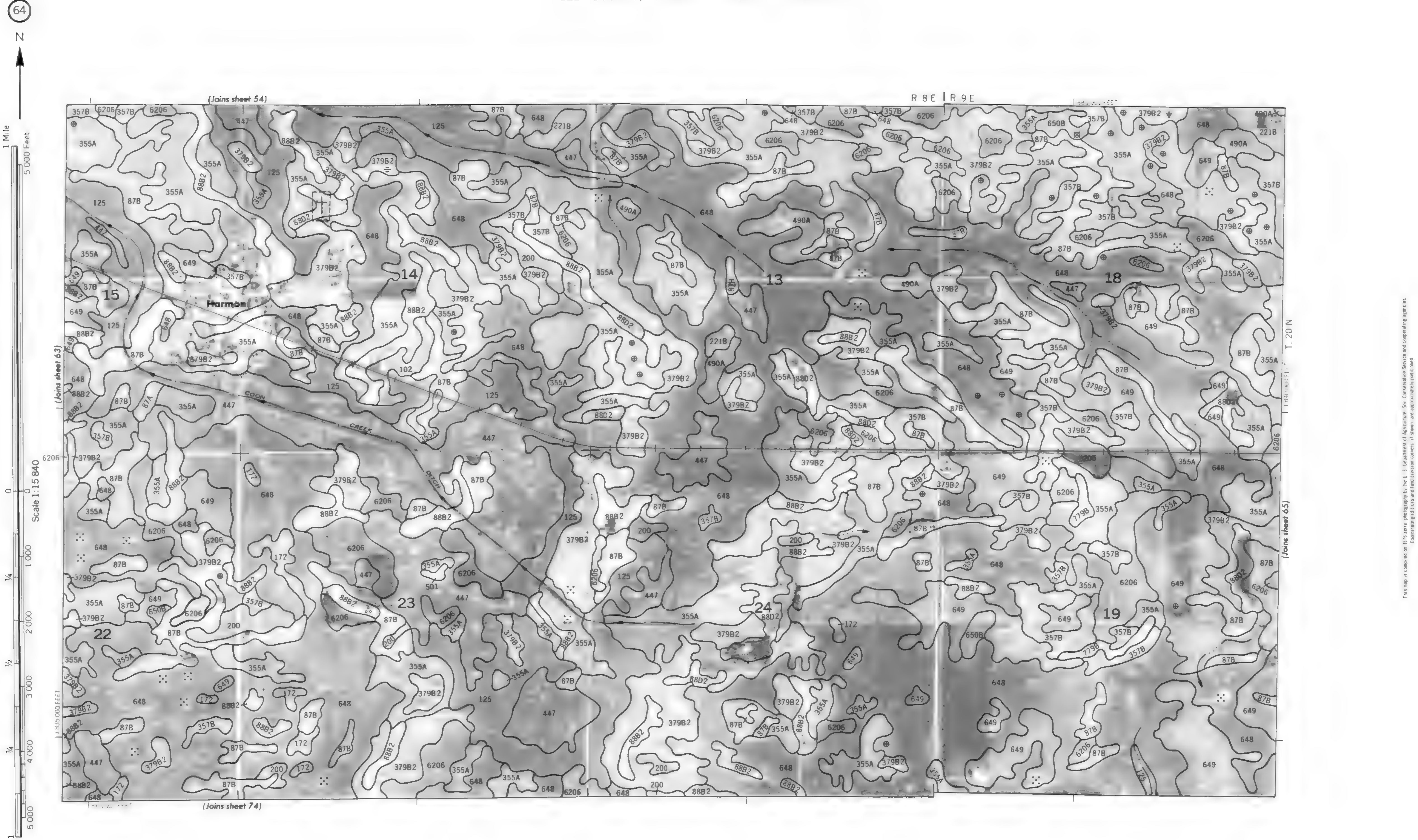
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



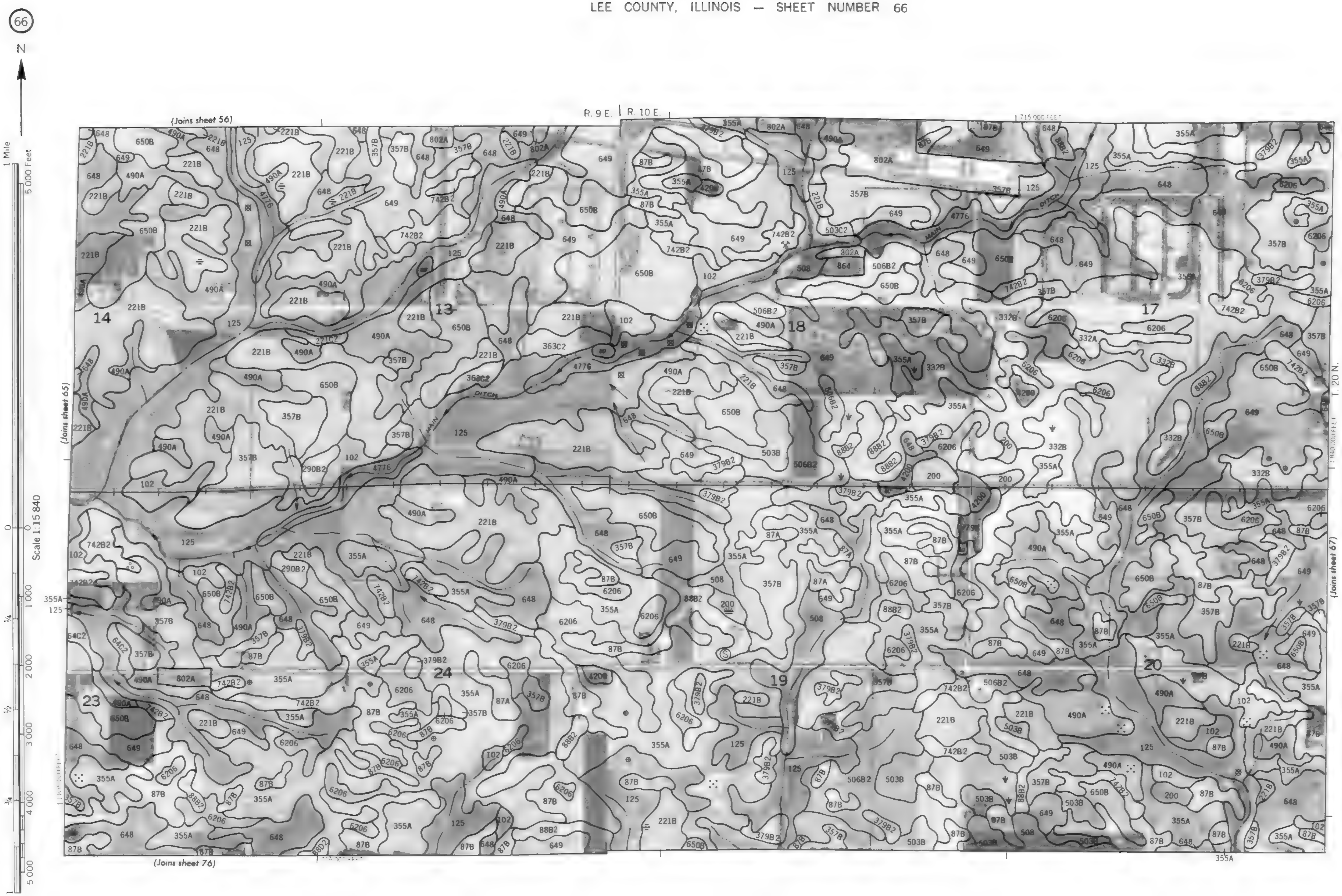
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


62
N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 51)
R. 2 E.
(Joins sheet 61)
(Joins inset A, sheet 52)
T. 38 N.
(Joins sheet 72)
PROPOSED NORTH-SOUTH FREEWAY
815 000 FEET
20
21
22
23
26
27
28
29

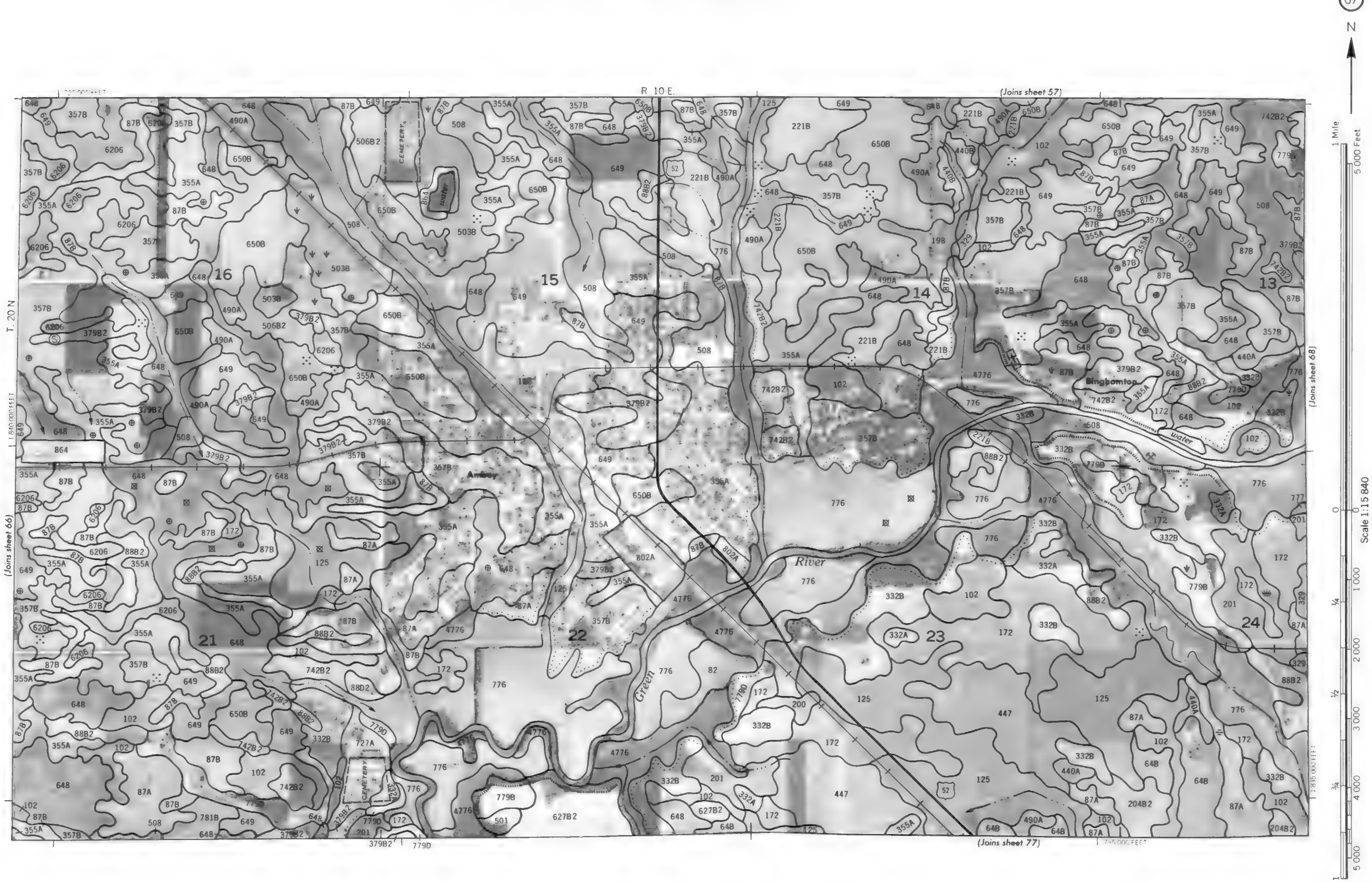
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

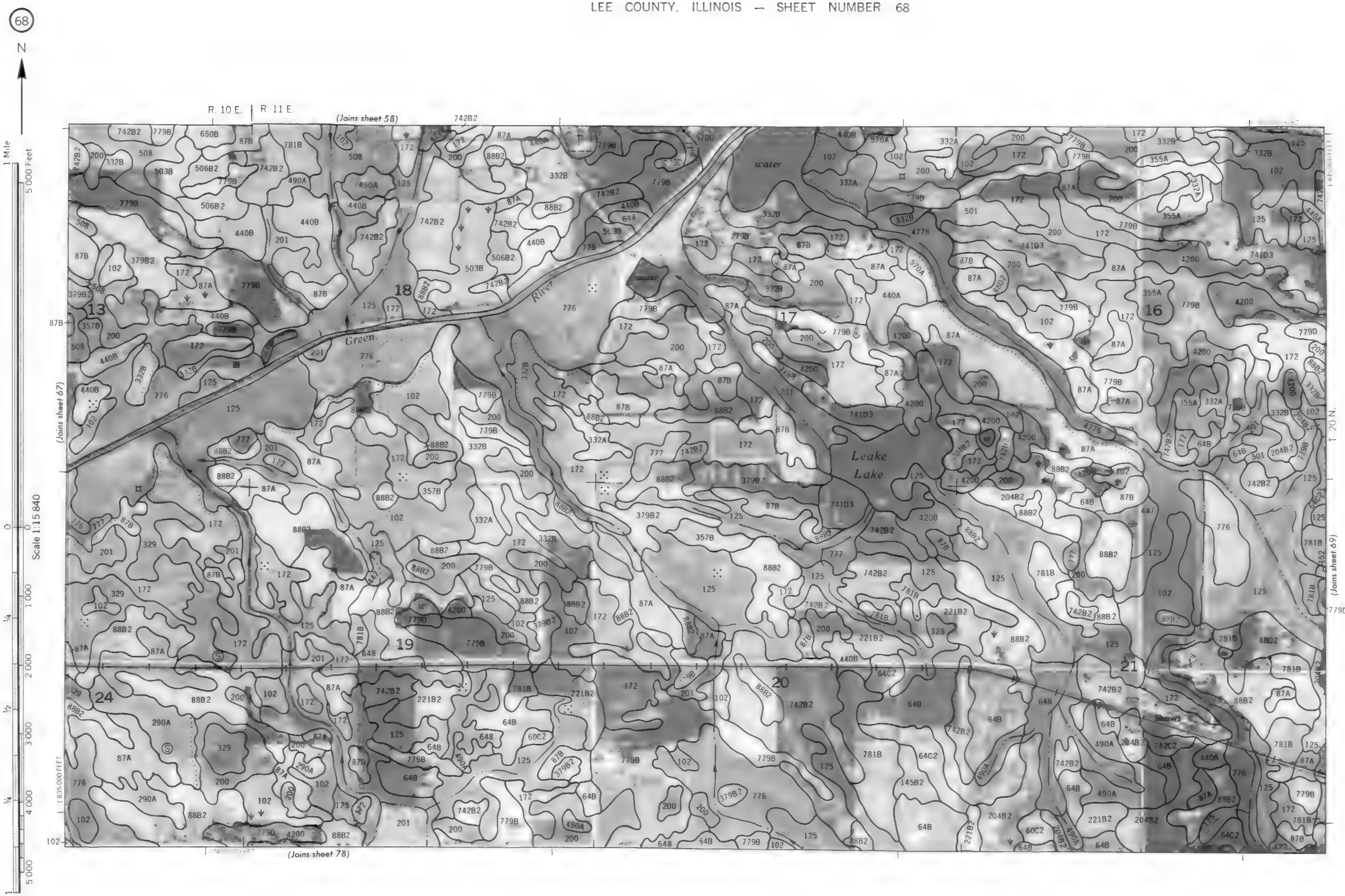

64
N
(Joins sheet 54)
(Joins sheet 63)
(Joins sheet 65)
(Joins sheet 74)
R 8 E
R 9 E
T. 20 N
Harmon
COON
CREEK
DITCH
13
14
15
18
19
22
23
24
1 Mile
5 000 Feet
Scale 1:15 840
1 835 000 FEET

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



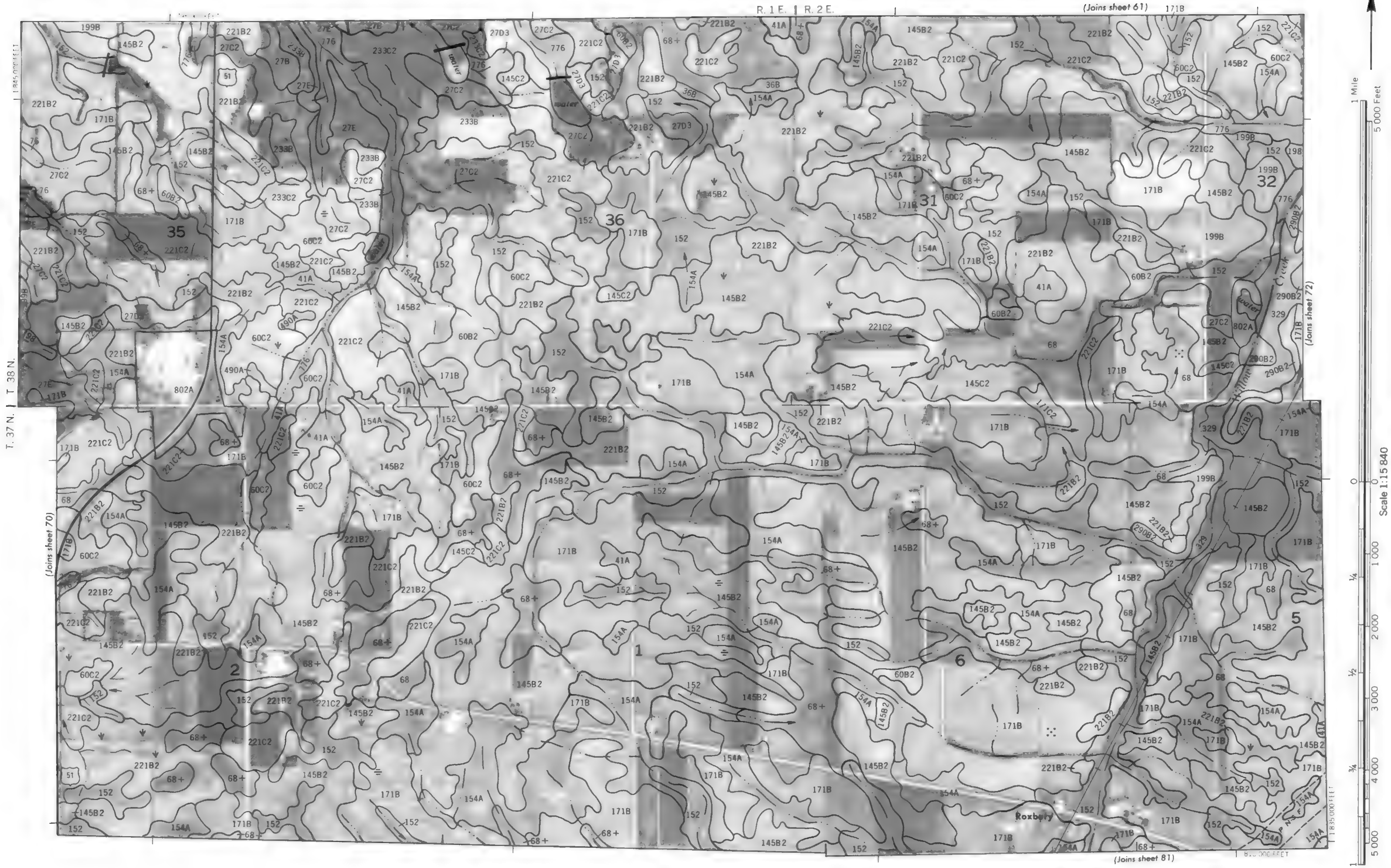
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


67
N
R. 10 E.
(Joins sheet 57)
(Joins sheet 68)
(Joins sheet 77)
(Joins sheet 66)
T. 20 N.
1 840 000 FEET
1 835 000 FEET
745 000 FEET
16
15
14
13
21
22
23
24
Amboy
Binghamton
Green
River
CEMETERY
CEMETERY
water
water
52
1 Mile
5 000 Feet
Scale 1:15 840
0
¼
½
¾
1000
2000
3000
4000
5000

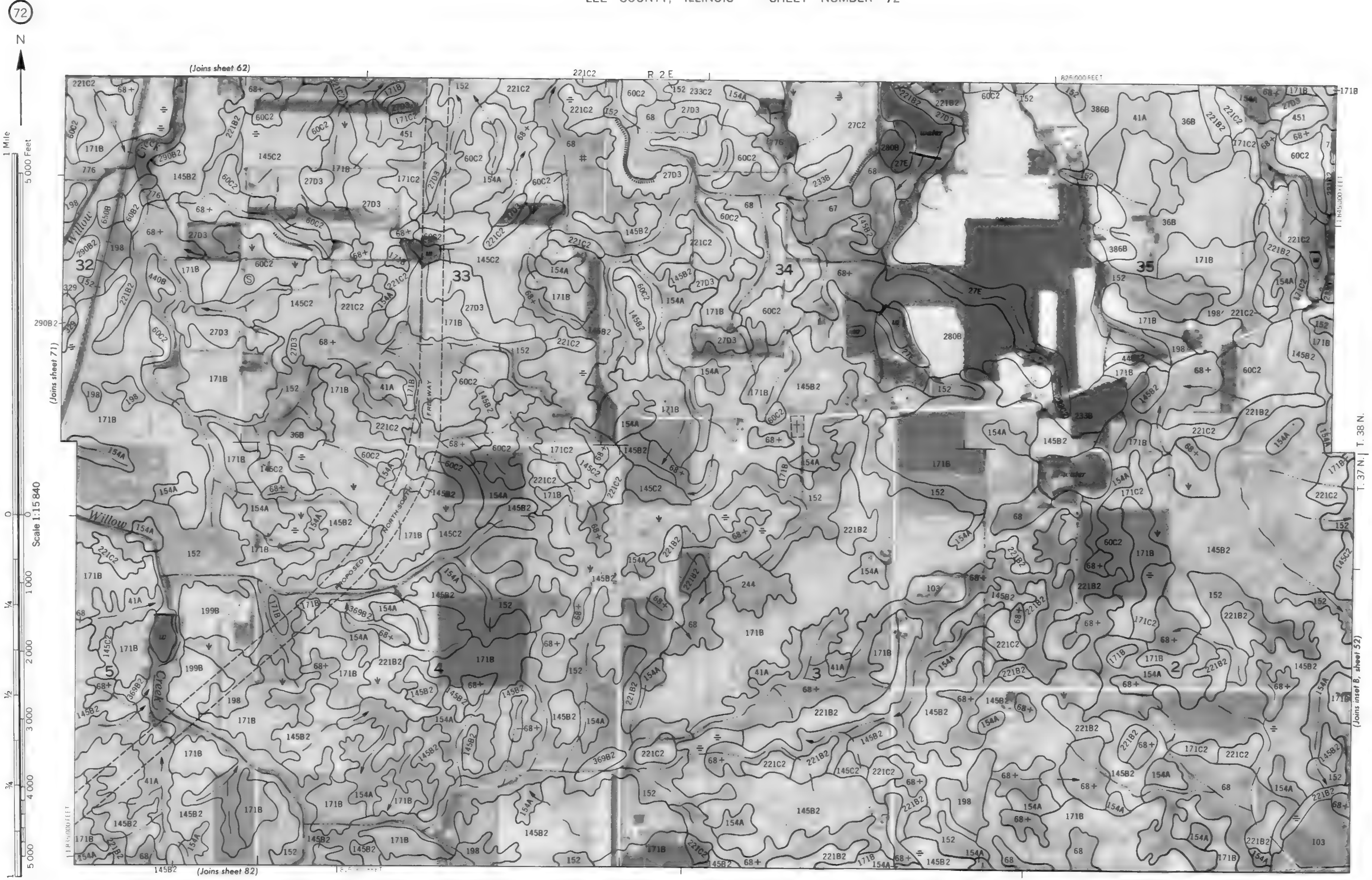

68
N
R. 10 E.
R. 11 E.
(Joins sheet 58)
(Joins sheet 67)
(Joins sheet 69)
(Joins sheet 78)
T. 20 N.
Green River
Leake Lake
water
Shaws
13
16
17
18
19
20
21
24
1 Mile
5 000 Feet
Scale 1:15 840


N
R. 11 E. | R. 1 E.
(Joins sheet 59)
(sh60)
(Joins sheet 70)
(Joins sheet 68)
(Joins sheet 79)
T. 20 N.
T. 38 N.
T. 37 N.
THIRD PRINCIPAL MERIDIAN
760 000 FEET
15
14
13
31
22
23
24
6
1 Mile
5 000 Feet
Scale 1:15 840
water


N
(Joins sheet 60)
R 1 E.
(Joins sheet 69)
(Joins sheet 71)
(Joins sheet 80)
T. 38 N.
T. 37 N.
31
32
33
34
6
5
4
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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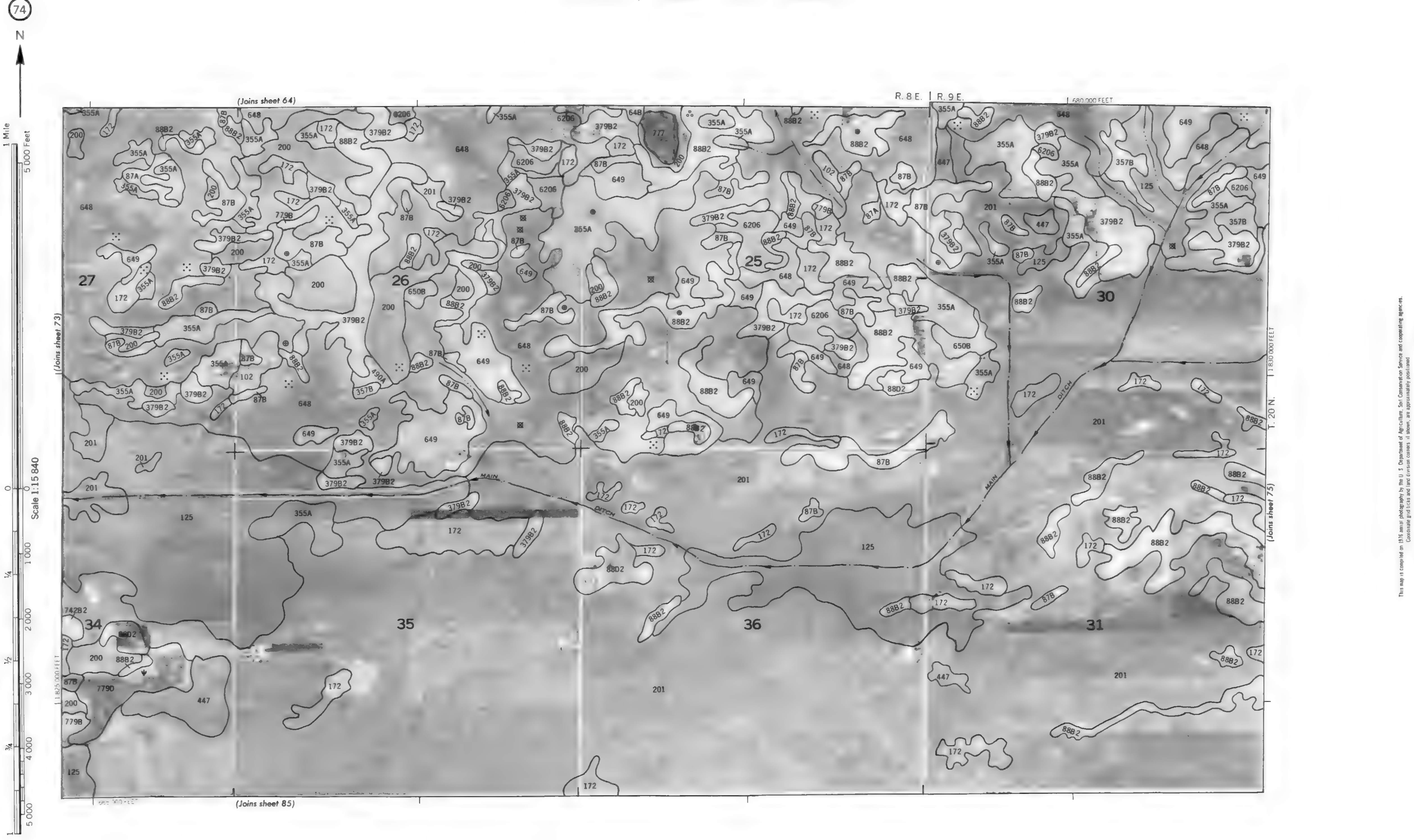

74
N
(Joins sheet 64)
R. 8 E.
R. 9 E.
680 000 FEET
(Joins sheet 73)
(Joins sheet 75)
(Joins sheet 85)
T. 20 N.
1 830 000 FEET
1 825 000 FEET
27
26
25
30
34
35
36
31
MAIN DITCH
1 Mile
5 000 Feet
Scale 1:15 840
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

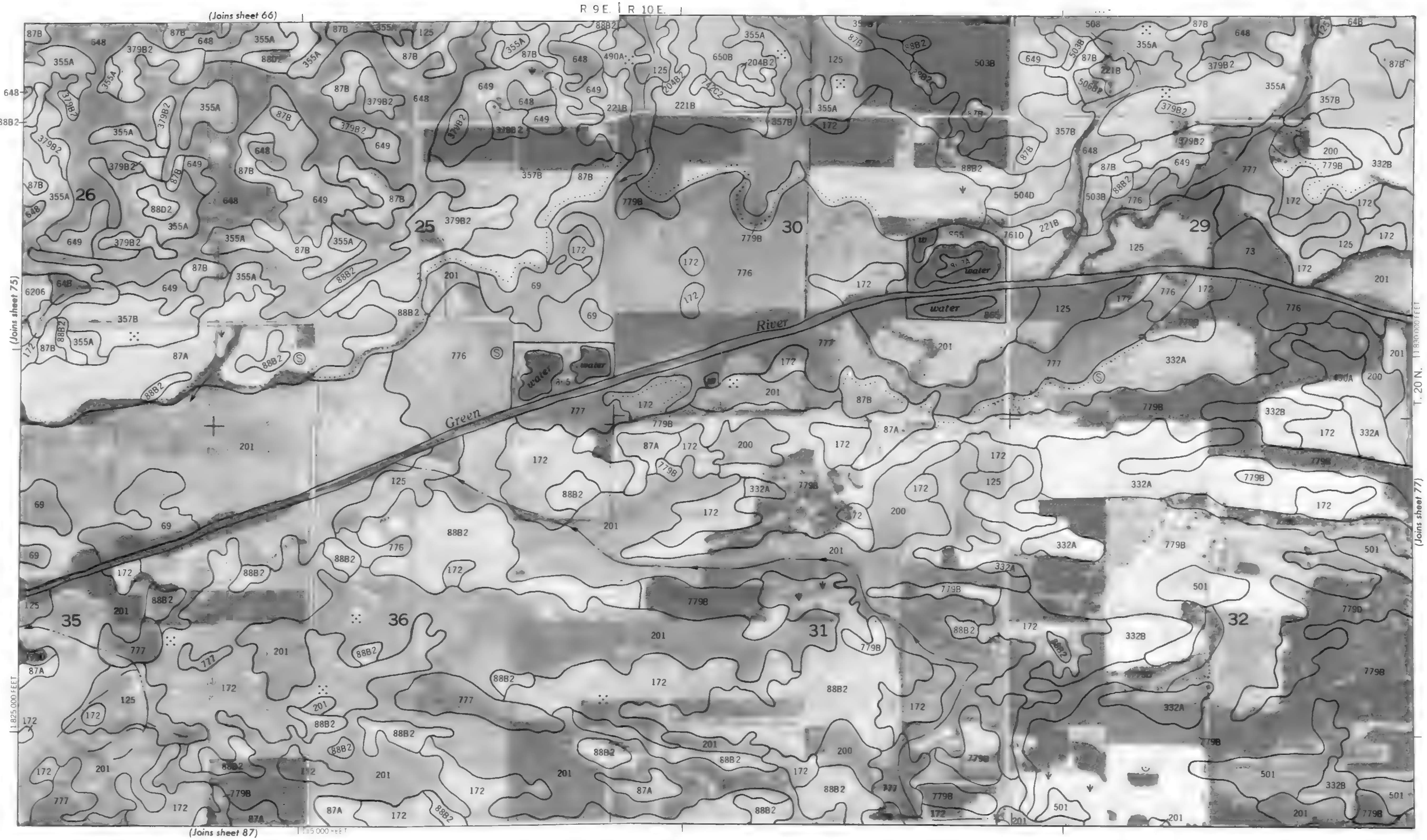
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

1 Mile

5 000 Feet

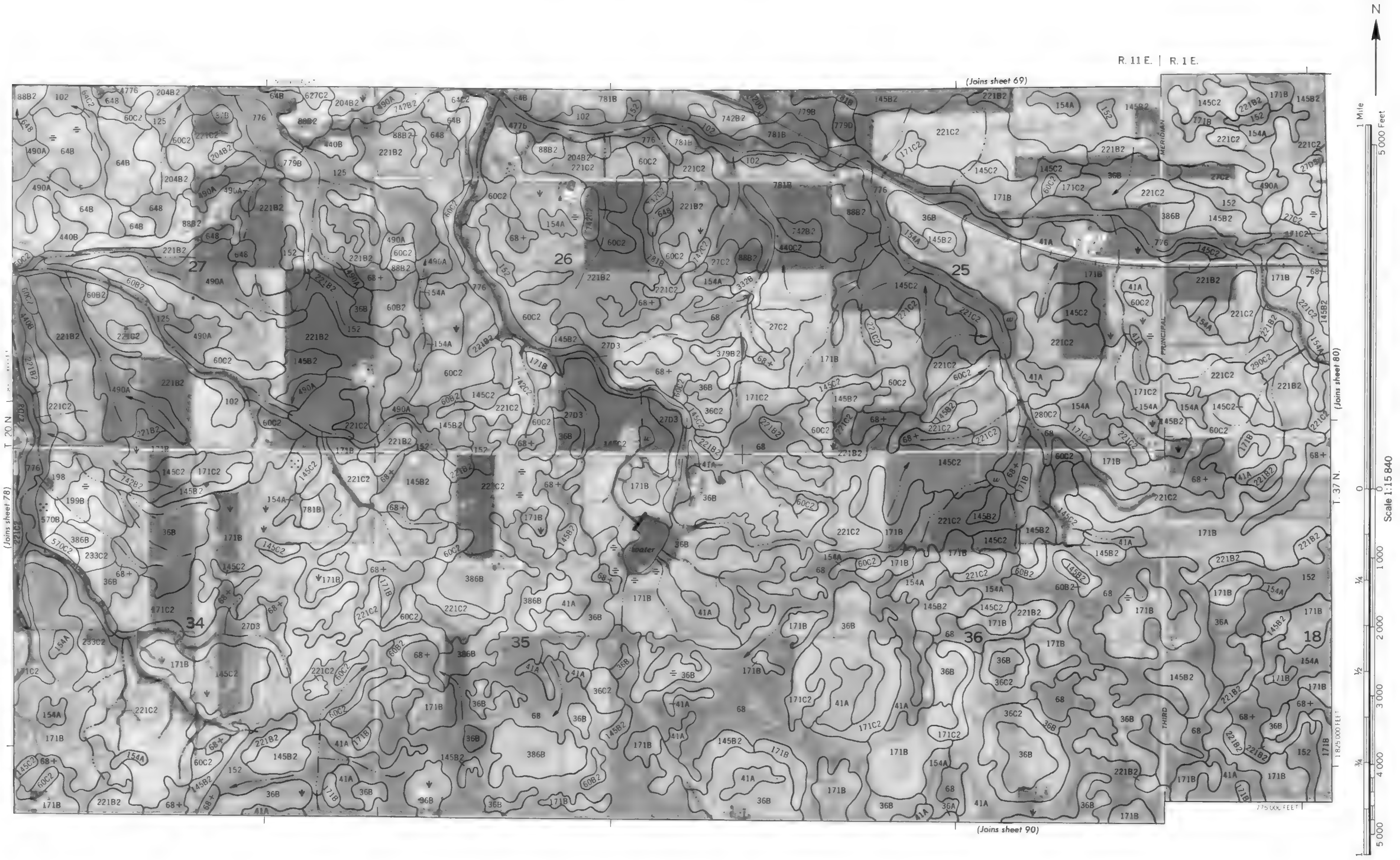
Scale 1:15 840

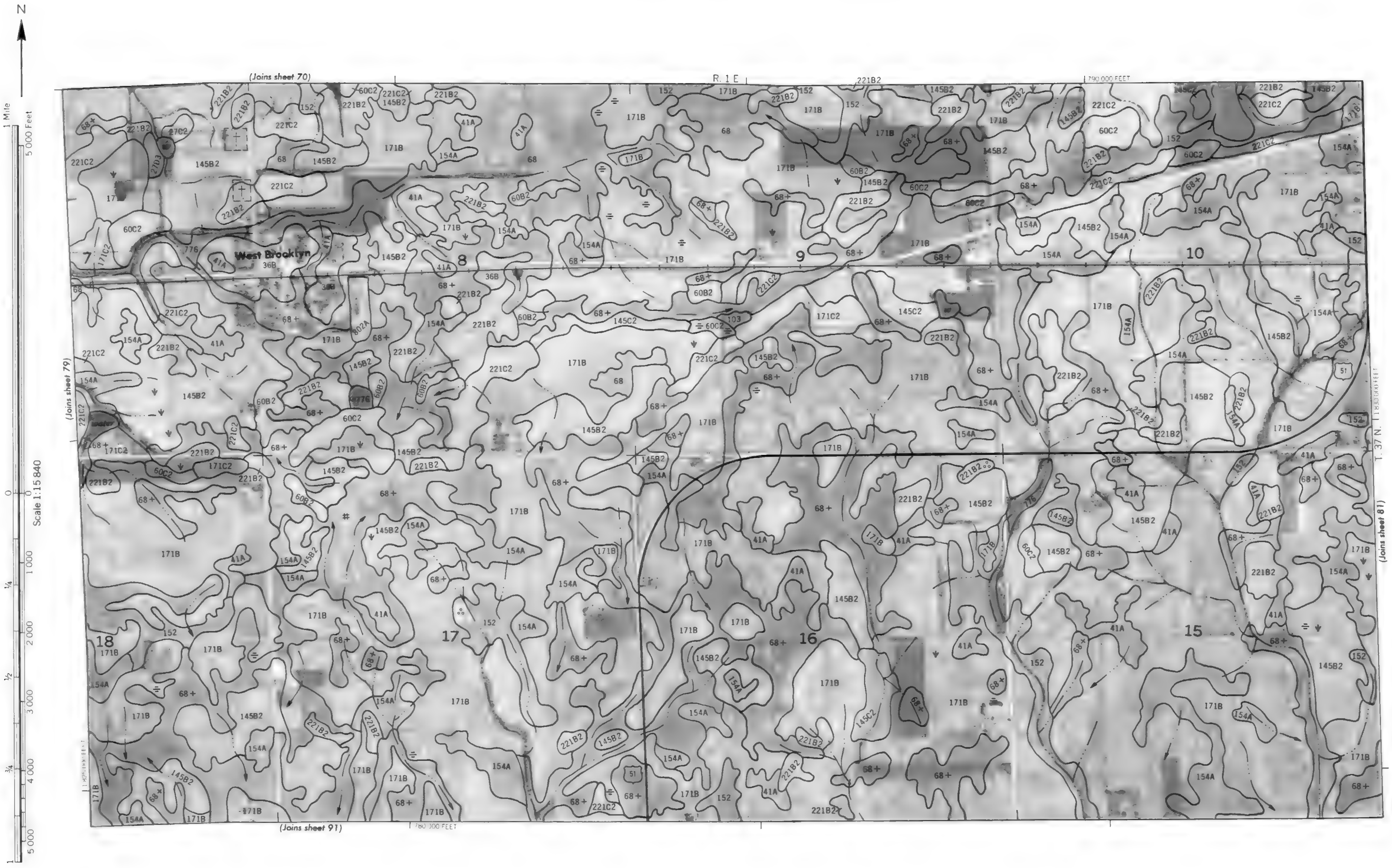


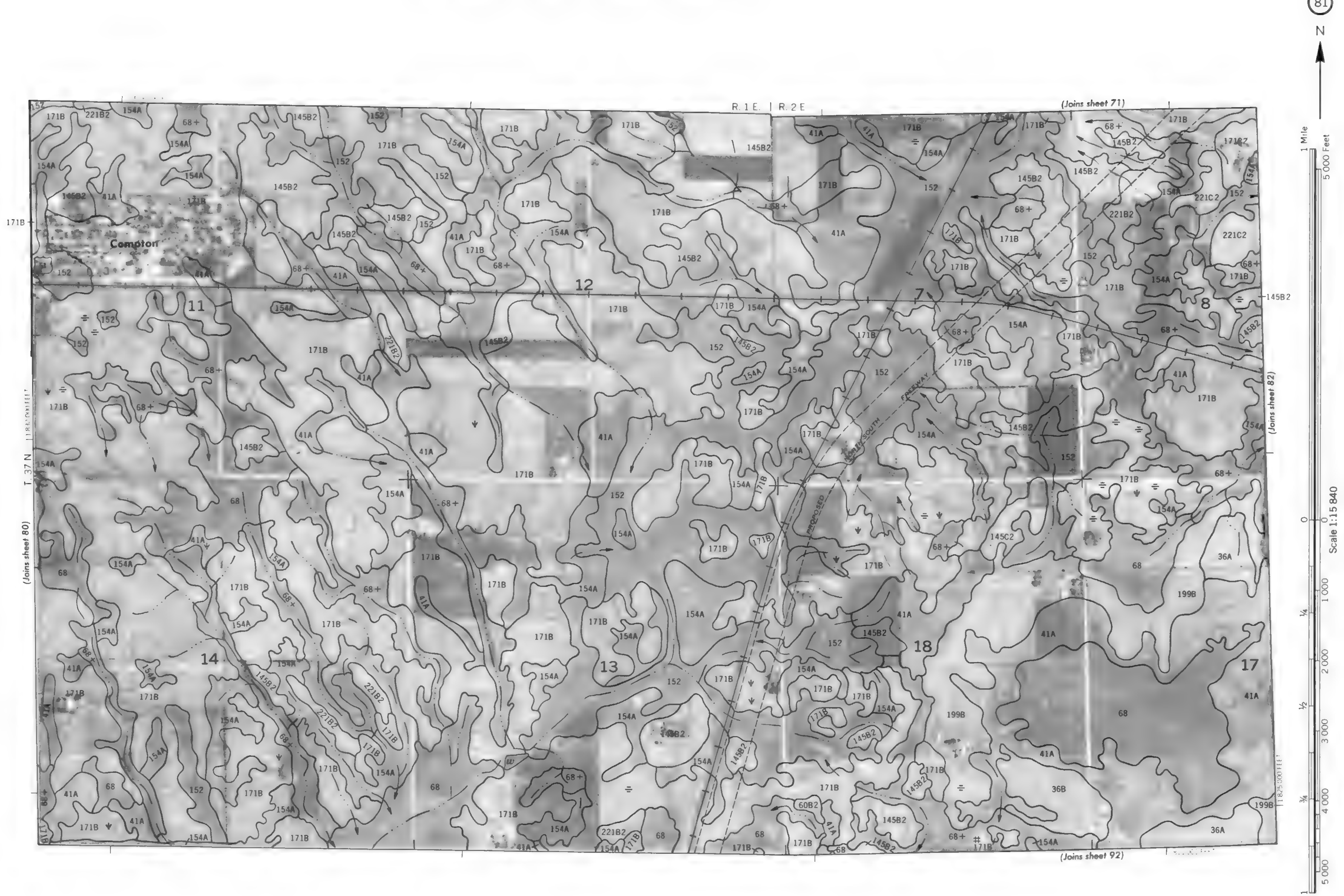
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on [illegible] aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.


N
R. 11 E.
R. 1 E.
(Joins sheet 69)
(Joins sheet 78)
(Joins sheet 80)
(Joins sheet 90)
T. 20 N.
T. 37 N.
PRINCIPAL
MERIDIAN
THIRD
water
1 Mile
5 000 Feet
Scale 1:15 840

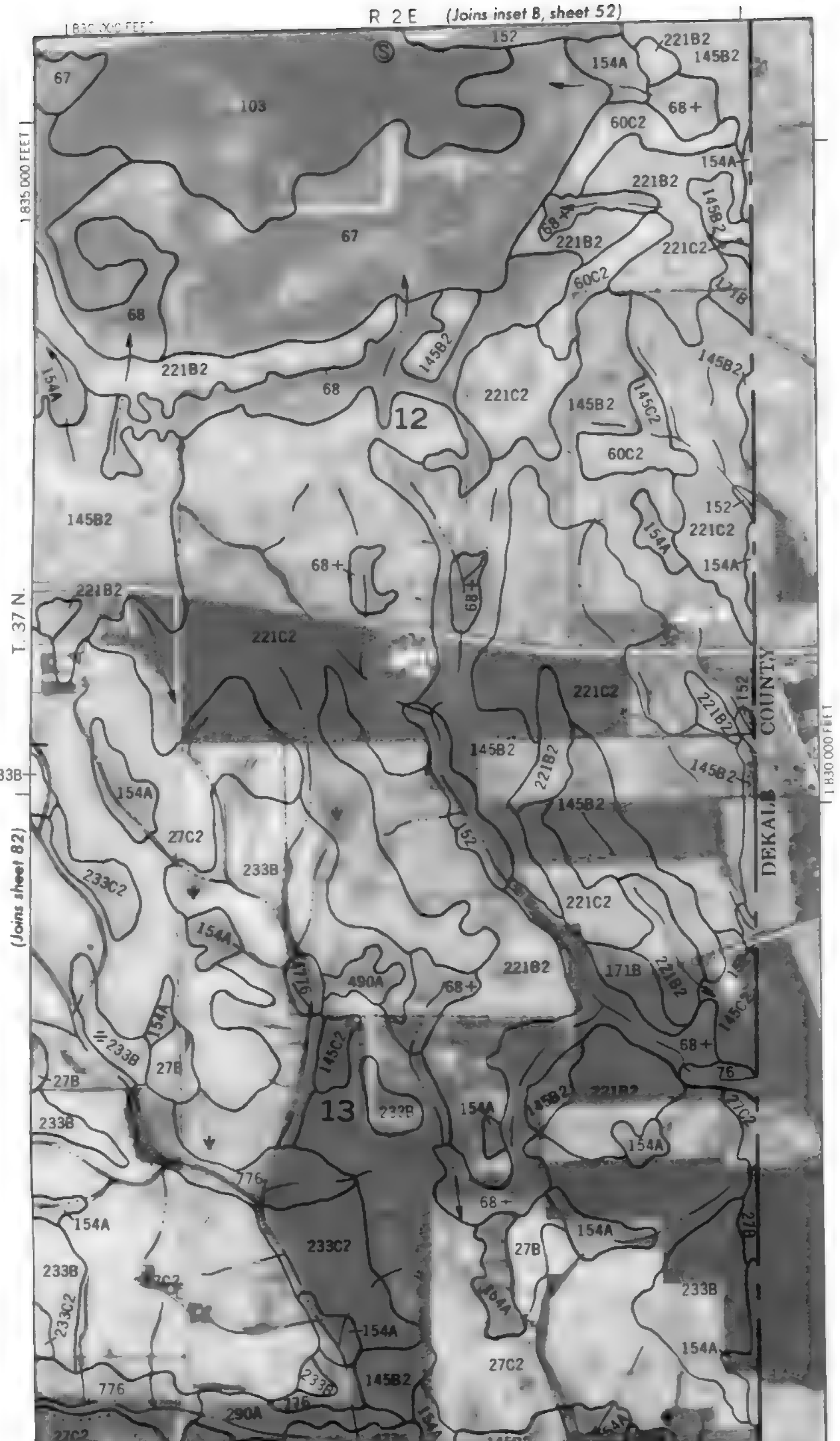

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 70)
R. 1 E.
790 000 FEET
West Brooklyn
7
8
9
10
(Joins sheet 79)
(Joins sheet 81)
T. 37 N.
18
17
16
15
(Joins sheet 91)
780 000 FEET



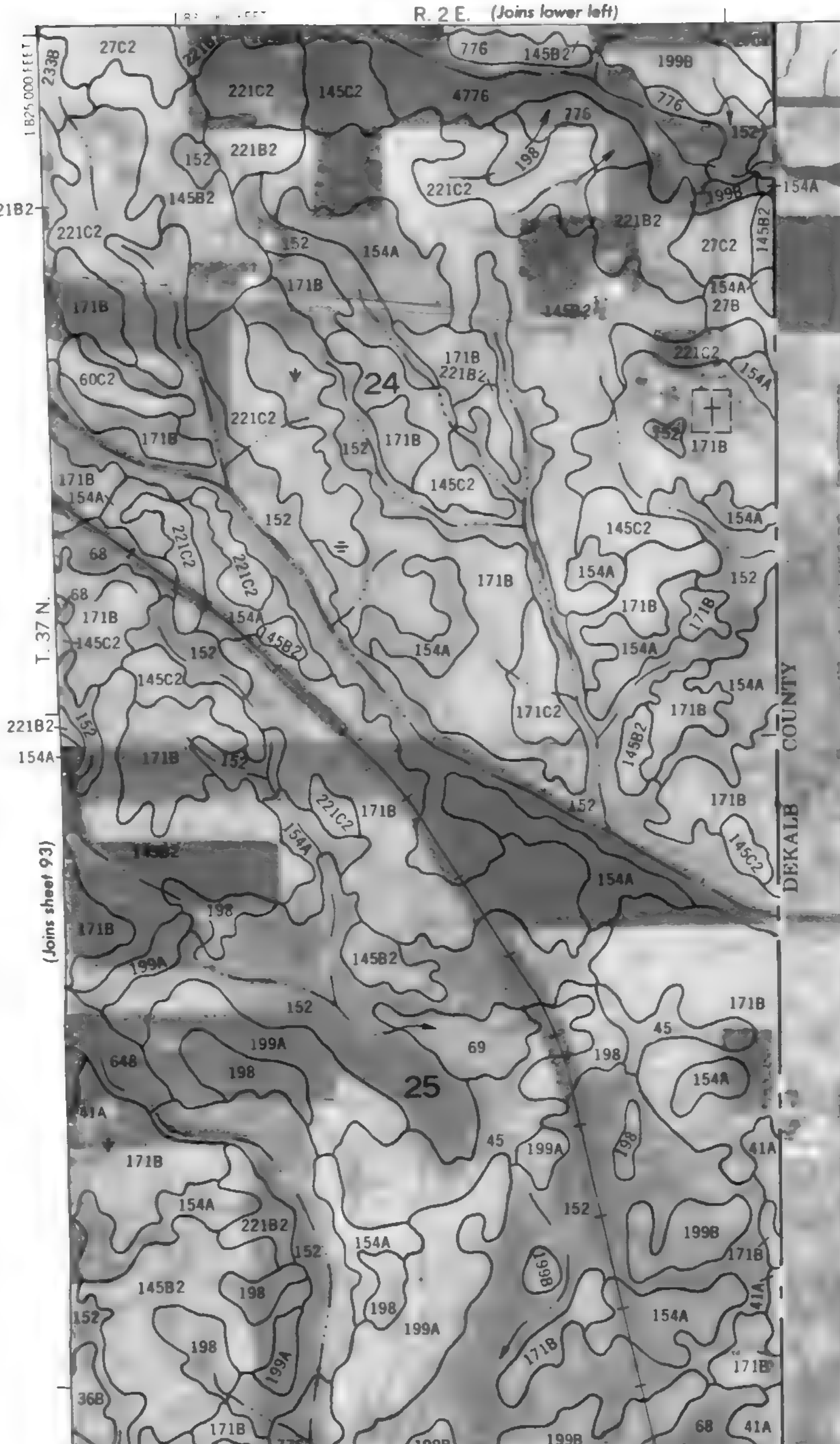
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


82
N
(Joins sheet 72)
R. 2 E.
(Joins sheet 81)
(Joins sheet 83)
(Joins sheet 93)
T. 37 N.
Paw Paw
water
8
9
10
11
14
15
16
17
Scale 1:15 840
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

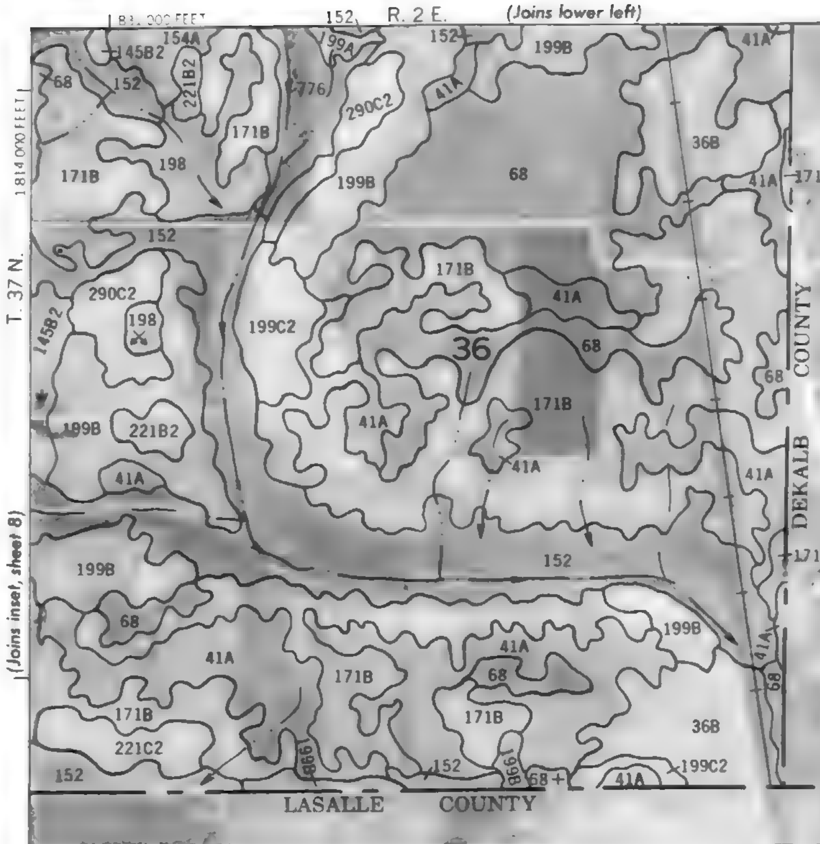


INSET A

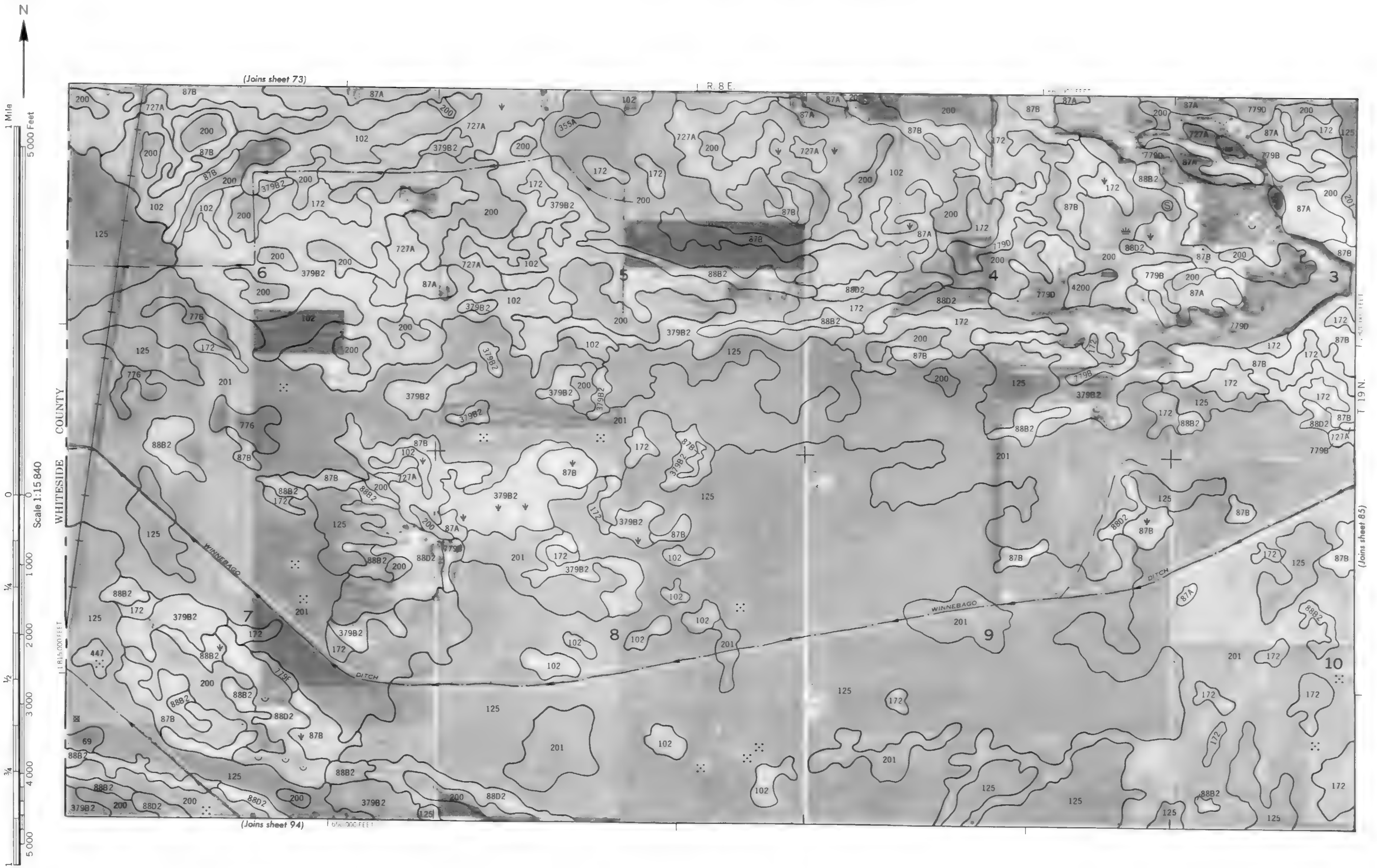


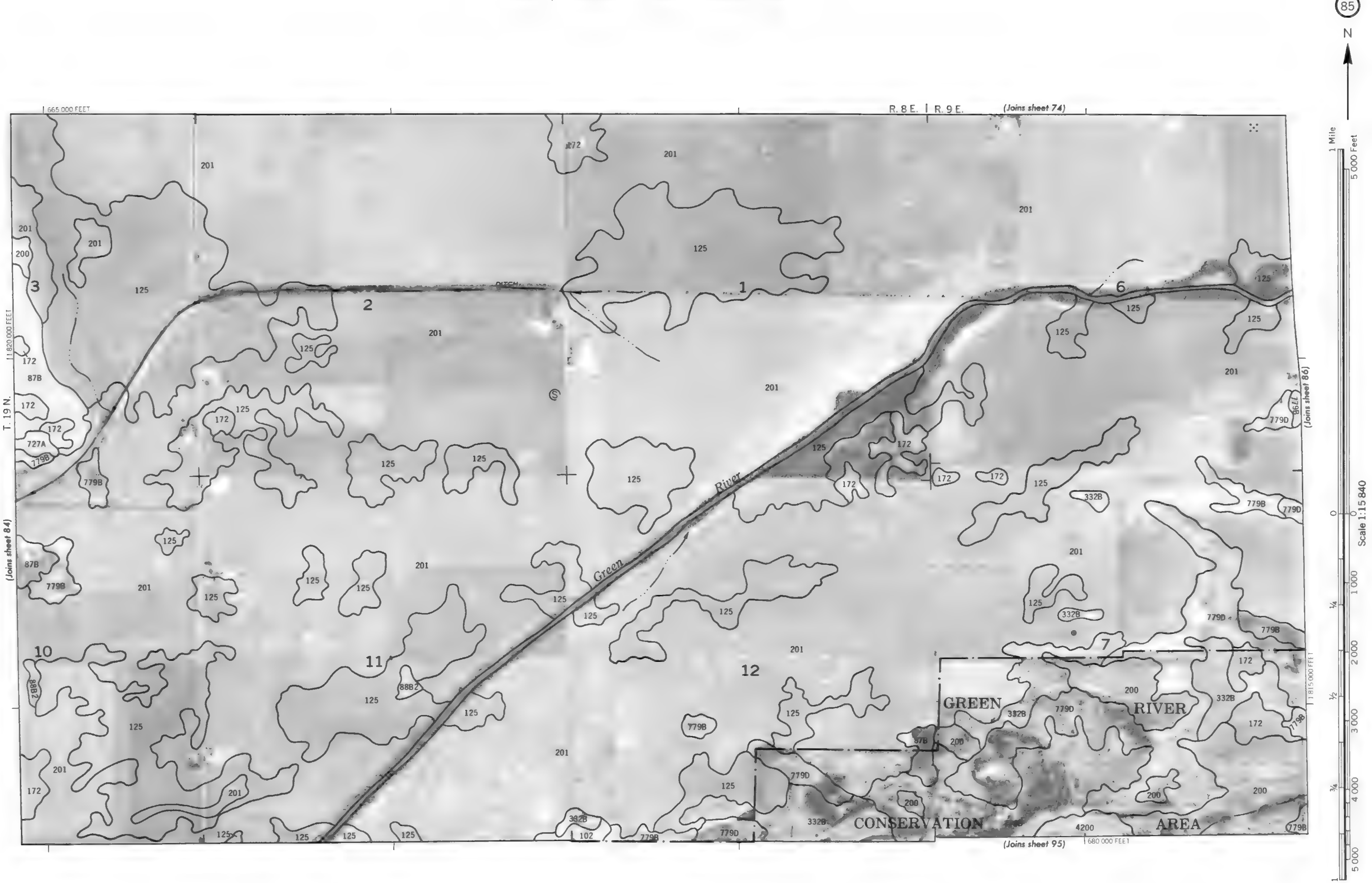
4000 AND 5000-FOOT GRID TICKS

INSET B

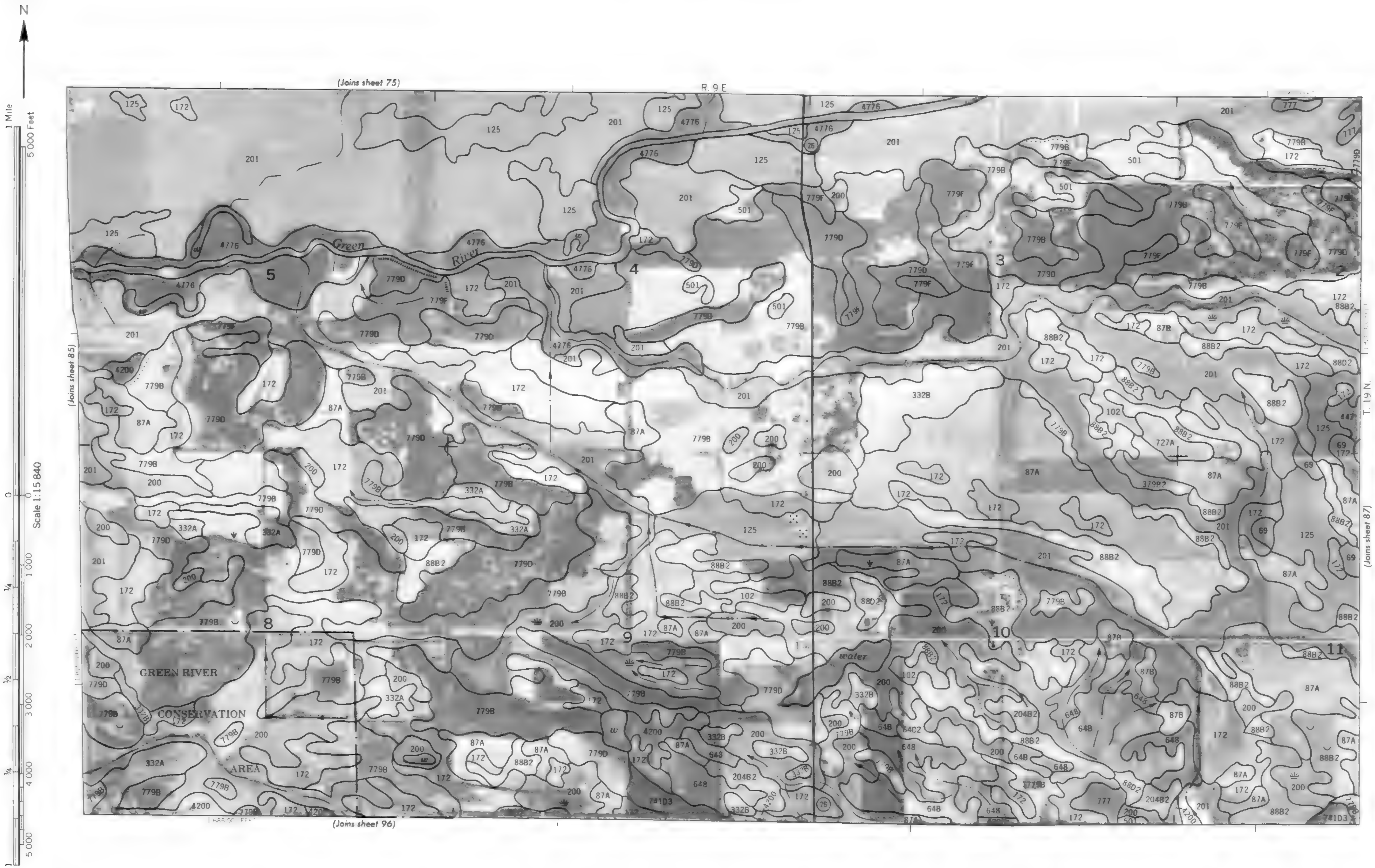


4000 AND 5000-FOOT GRID TICKS

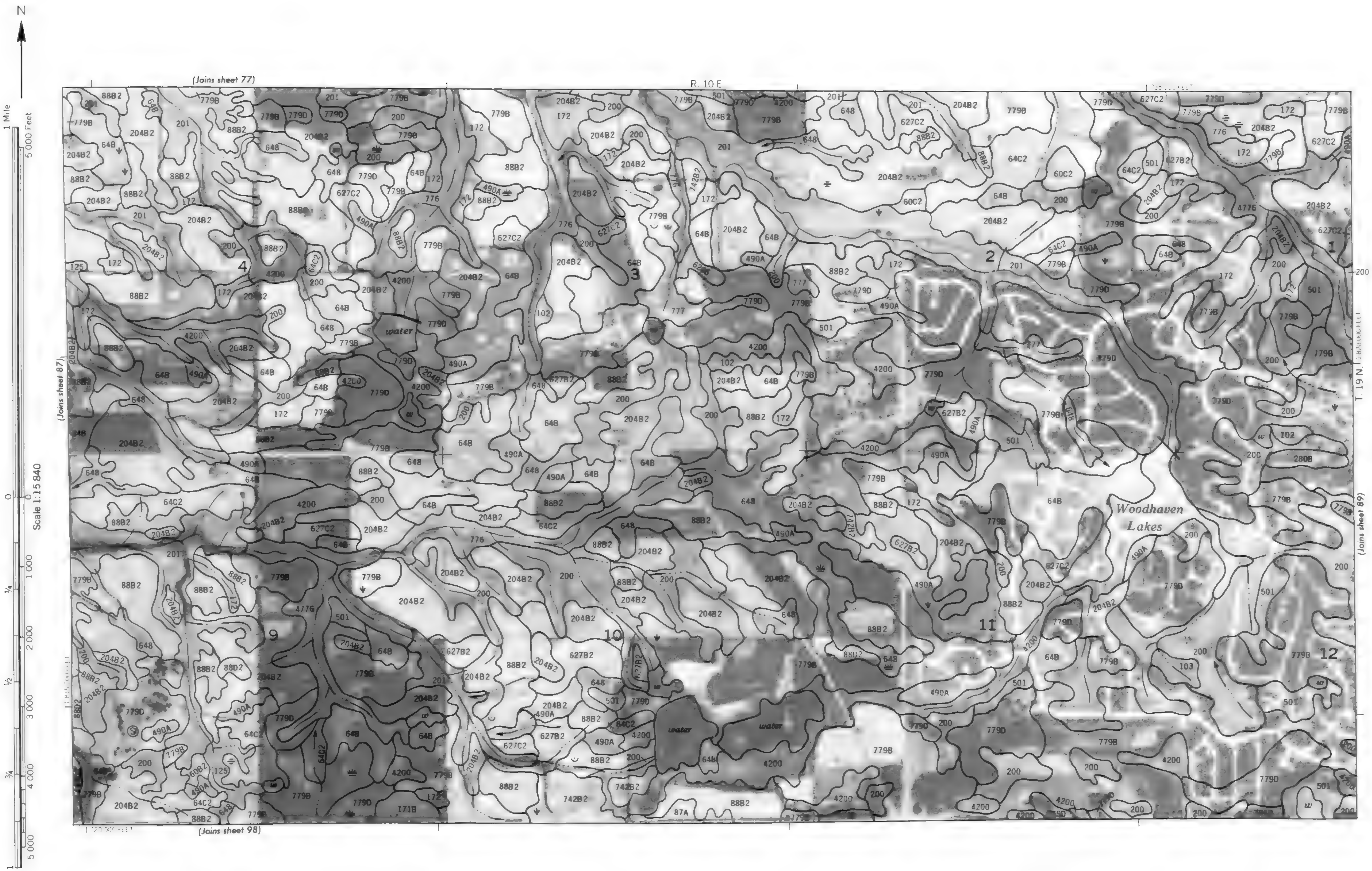

N
(Joins sheet 73)
R. 8 E.
T. 19 N.
(Joins sheet 85)
(Joins sheet 94)
WHITESIDE COUNTY
WINNEBAGO
DITCH
1 Mile
5 000 Feet
Scale 1:15 840
6
5
4
3
7
8
9
10



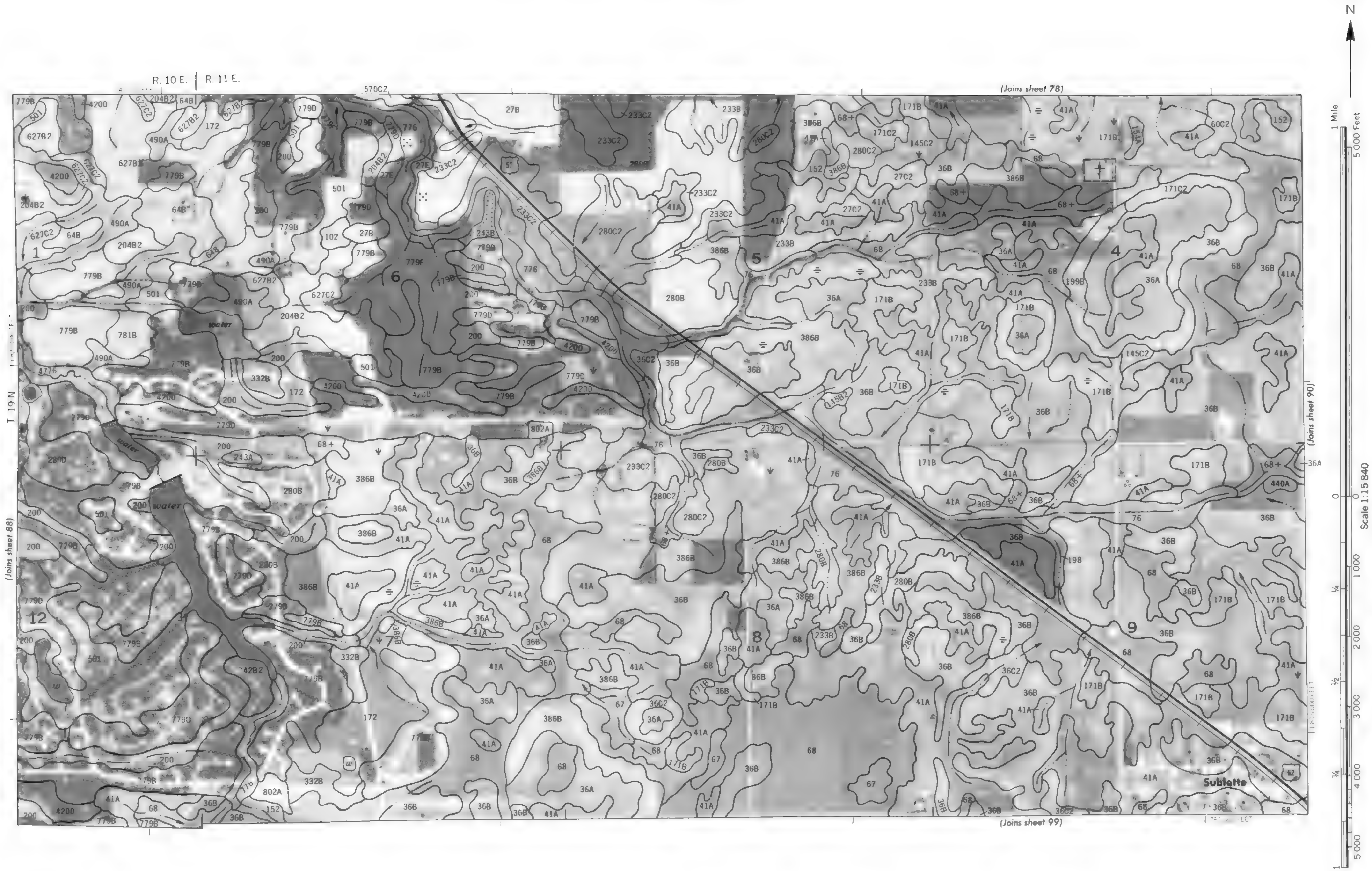
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 75)
R. 9 E.
(Joins sheet 85)
(Joins sheet 87)
T. 19 N.
(Joins sheet 96)
Green River
GREEN RIVER
CONSERVATION
AREA
water

Scale 1:15 840



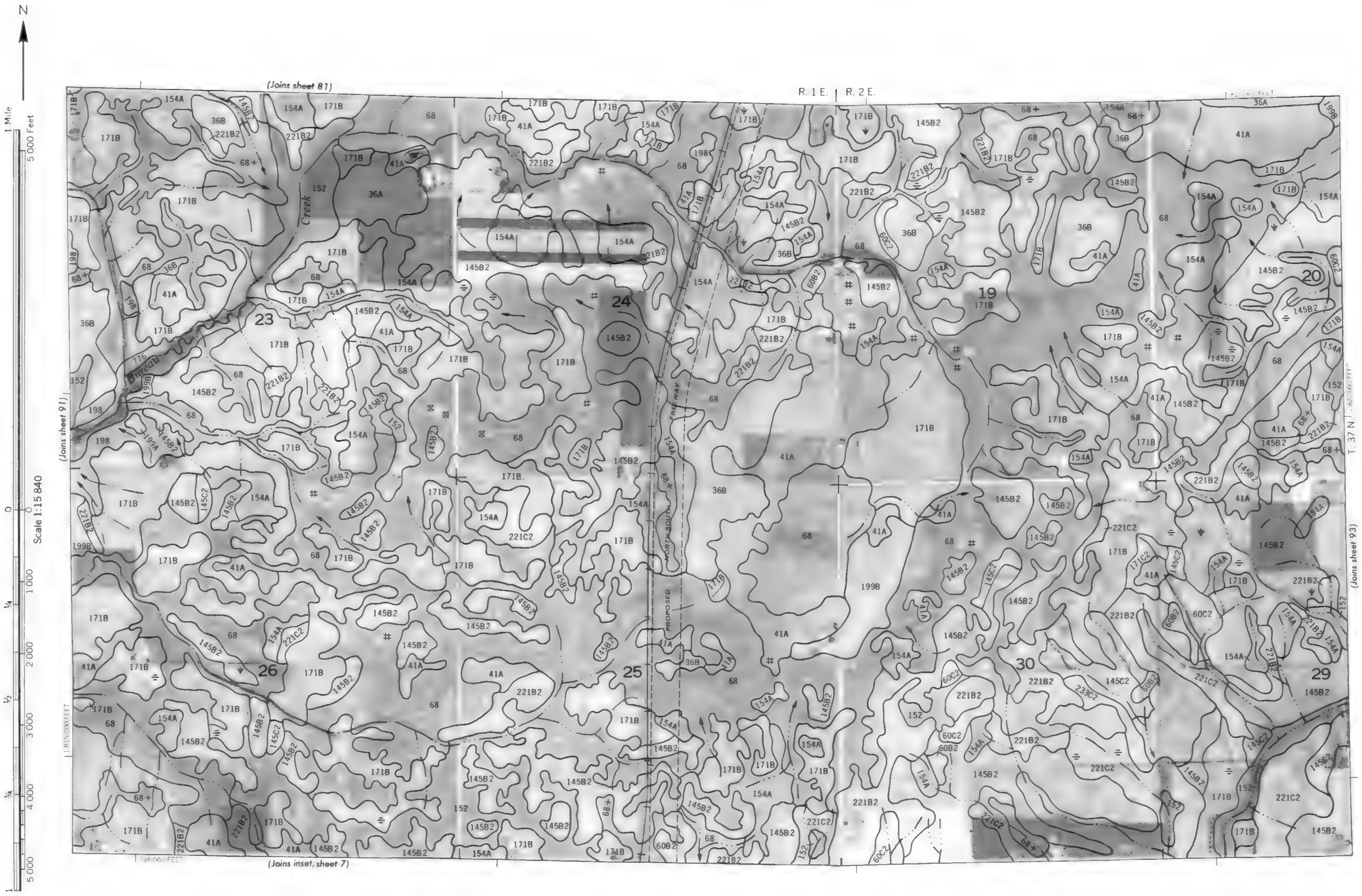
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned


N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 79)
(Joins sheet 89)
(Joins sheet 91)
(Joins sheet 100)
R. 11 E.
R. 1 E.
T 19 N
T. 37 N.
MERIDIAN
PRINCIPAL
THIRD
Sublette
1
2
3
10
11
12
19
30

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

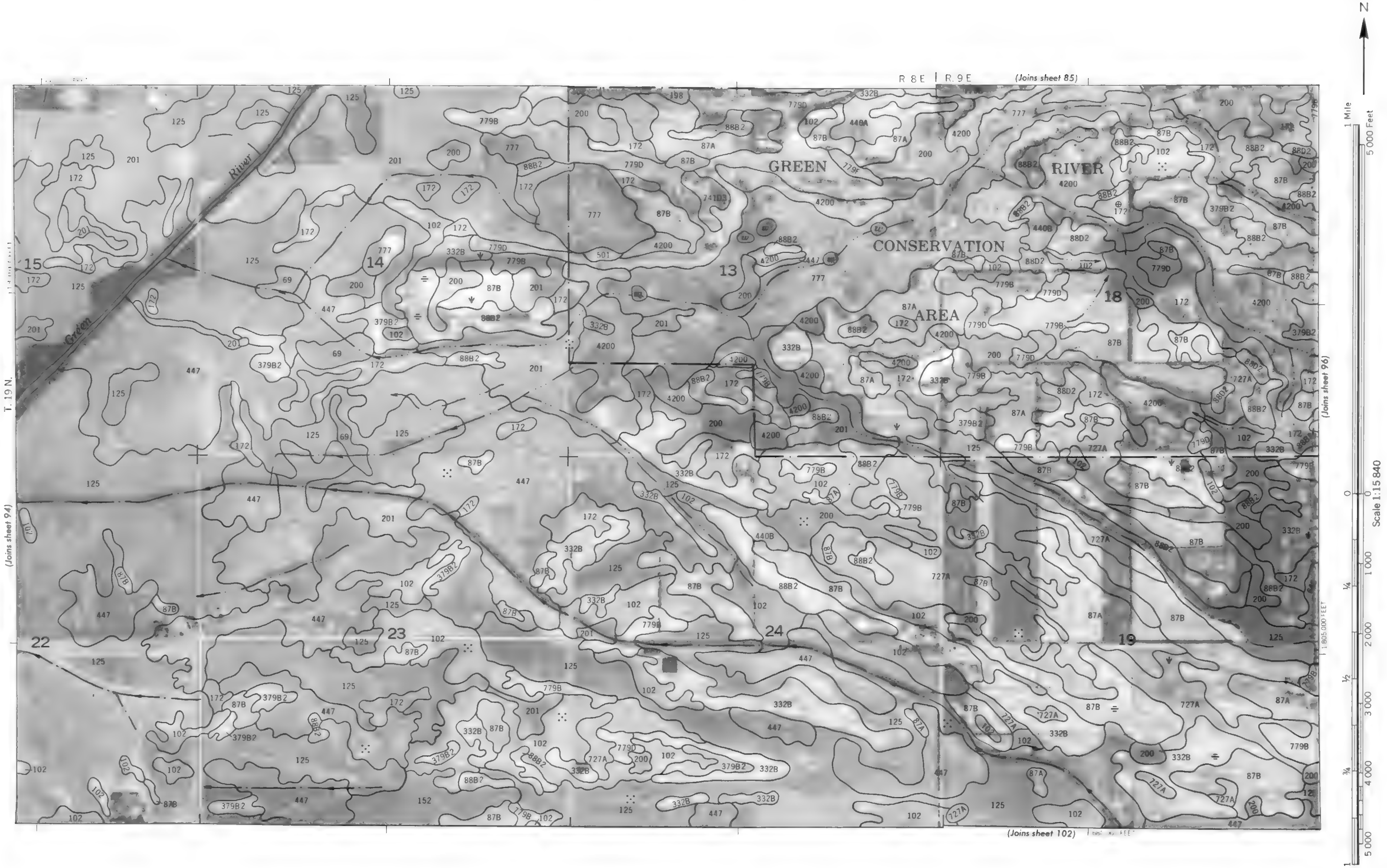

N
1 Mile
5 000 Feet
Scale 1:15 840
(Joins sheet 81)
(Joins sheet 91)
(Joins sheet 93)
(Joins inset, sheet 7)
R. 1 E. | R. 2 E.
T. 37 N.
Bureau Creek
PROPOSED NORTH-SOUTH FREEWAY
23
24
19
20
26
25
30
29

N

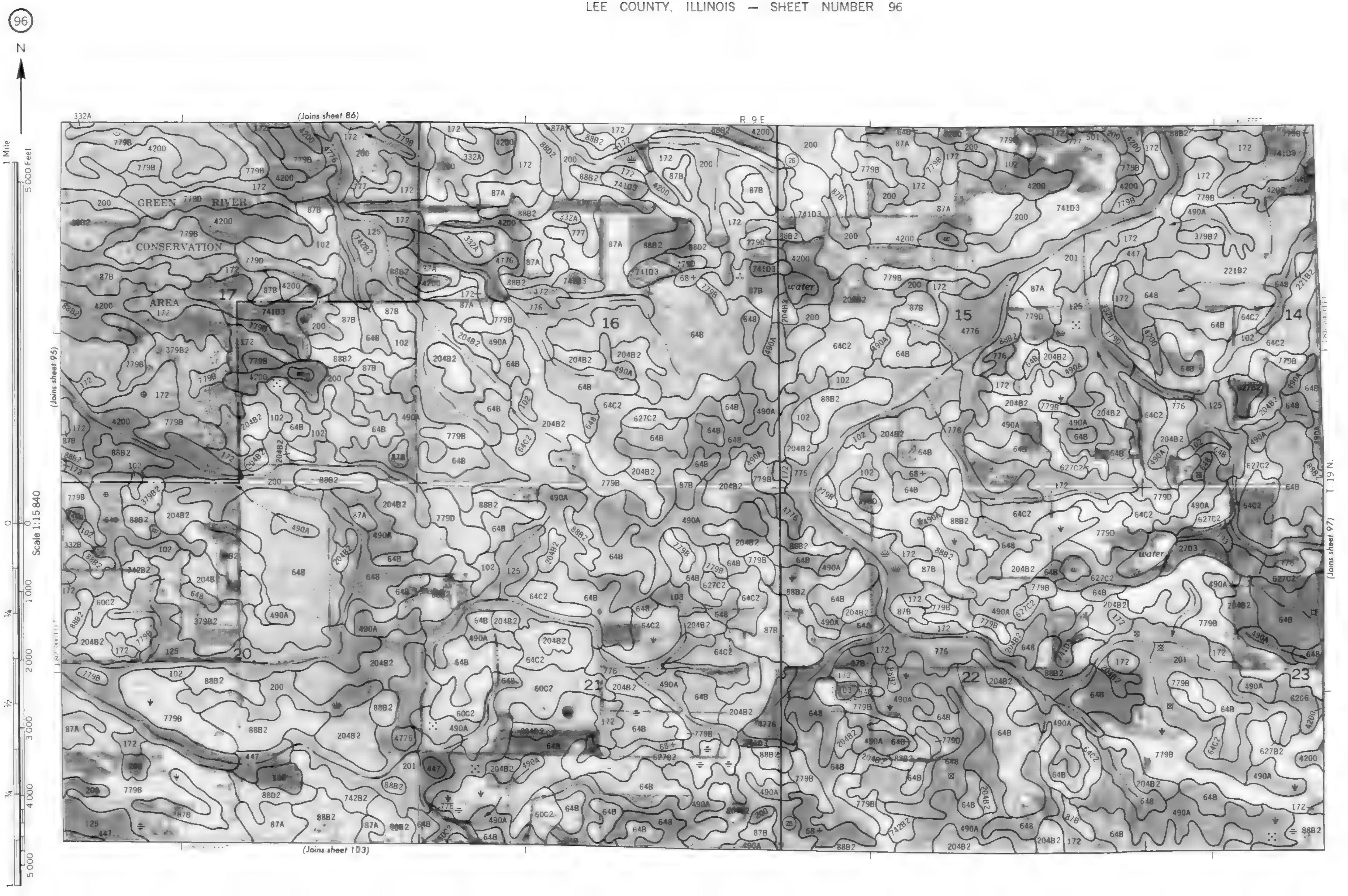
1 Mile
5 000 Feet
Scale 1:15 840

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

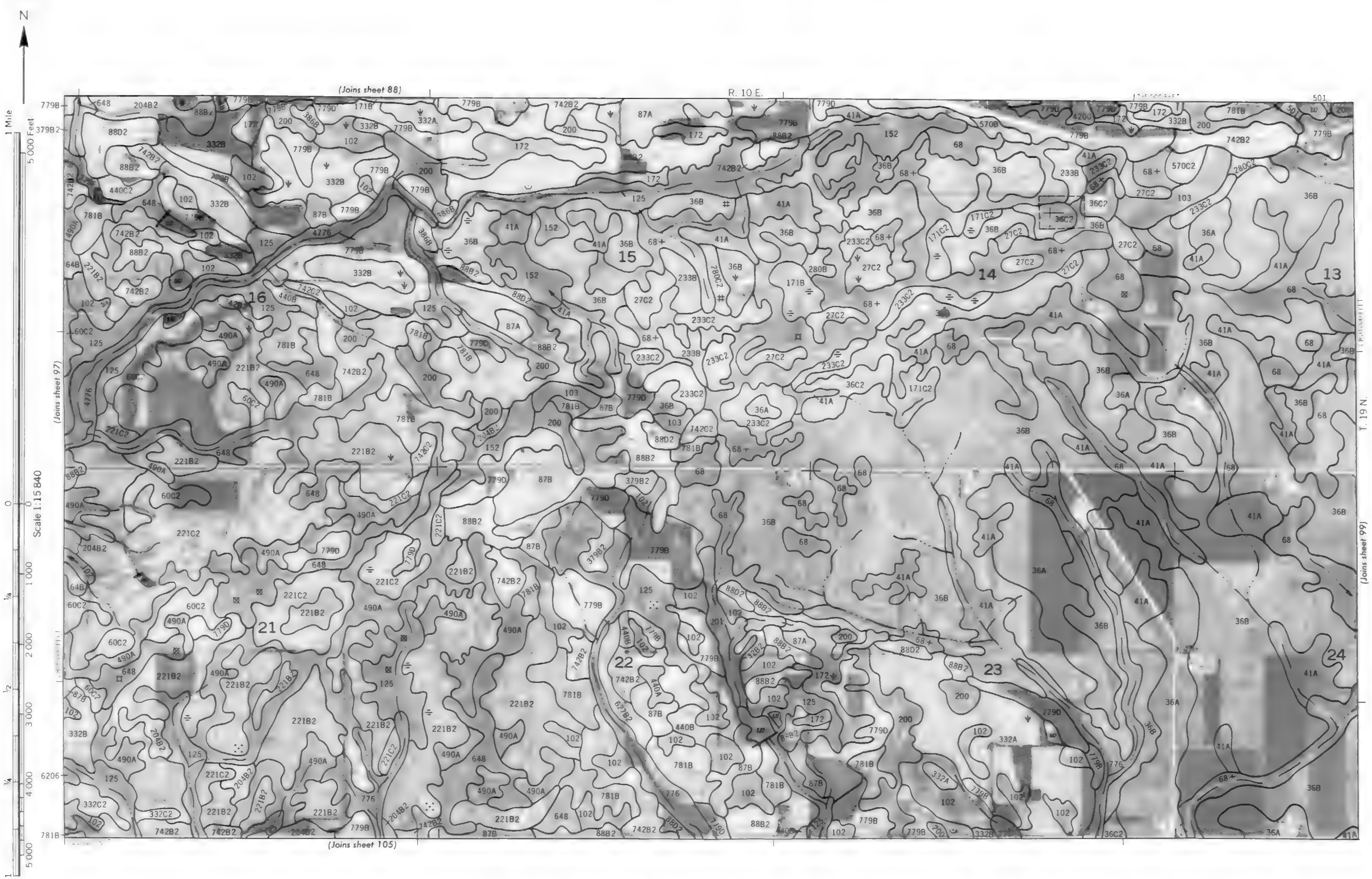
LEE COUNTY, ILLINOIS — SHEET NUMBER 94



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


96
N
(Joins sheet 86)
(Joins sheet 95)
(Joins sheet 97)
(Joins sheet 103)
R. 9 E.
T. 19 N.
GREEN RIVER
CONSERVATION
AREA
water
16
17
15
14
20
21
22
23
Scale 1:15 840
1 Mile
5 000 Feet
0
1 000
2 000
3 000
4 000
5 000
¼
½
¾
1


N
R. 9 E.
R. 10 E.
(Joins sheet 87)
(Joins sheet 98)
(Joins sheet 104)
(Joins sheet 96)
T. 19 N.
14
13
18
17
23
24
19
20
Maytown
1 Mile
5 000 Feet
Scale 1:15 840
0
1/4
1/2
3/4
1 000
2 000
3 000
4 000
5 000


N
(Joins sheet 88)
R. 10 E.
T. 19 N.
(Joins sheet 97)
(Joins sheet 99)
(Joins sheet 105)
Scale 1:15 840
1 Mile
5 000 Feet
1 000 Meters
16
15
14
13
21
22
23
24

N

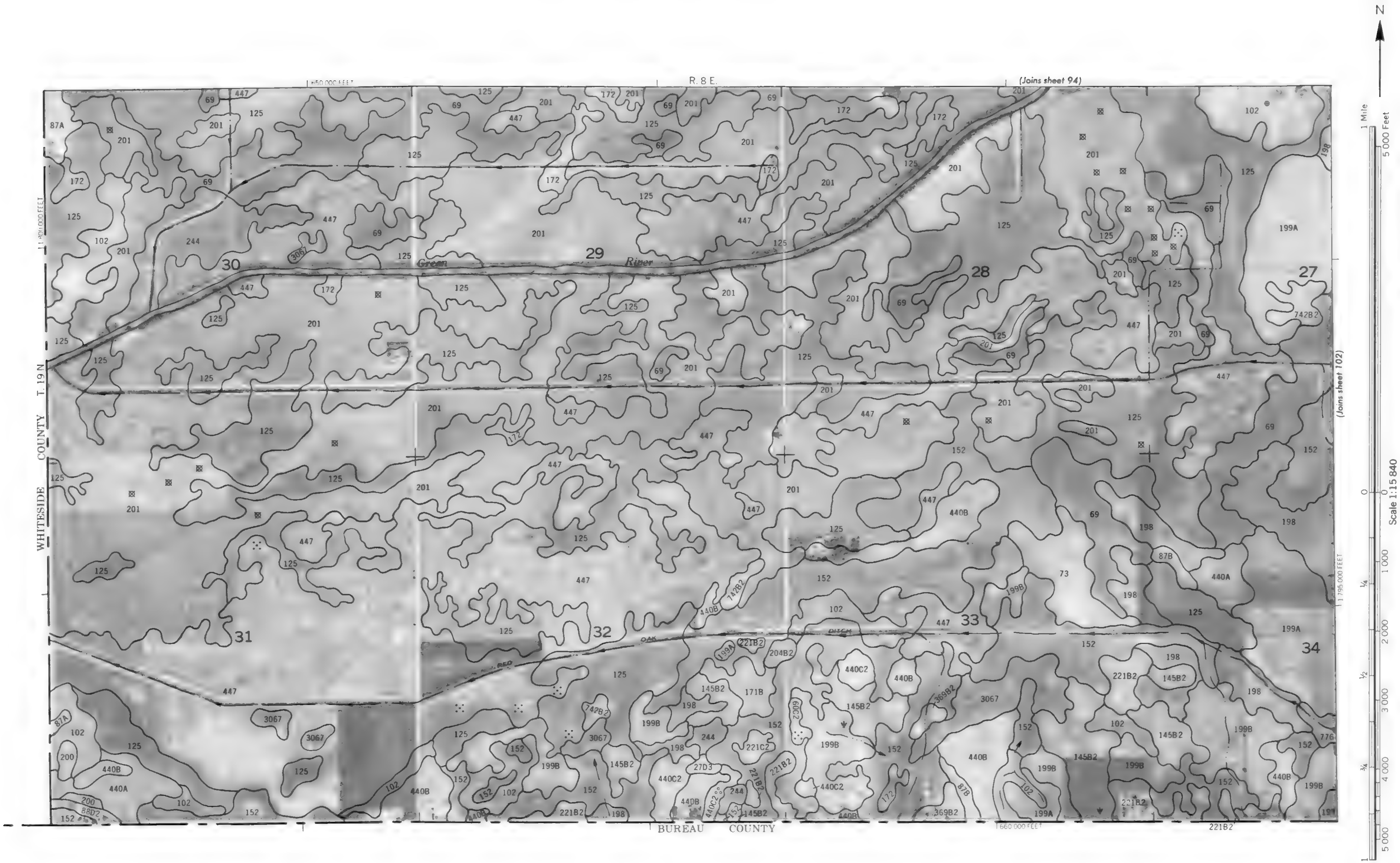
Scale 1:15 840

1 Mile

5 000 Feet

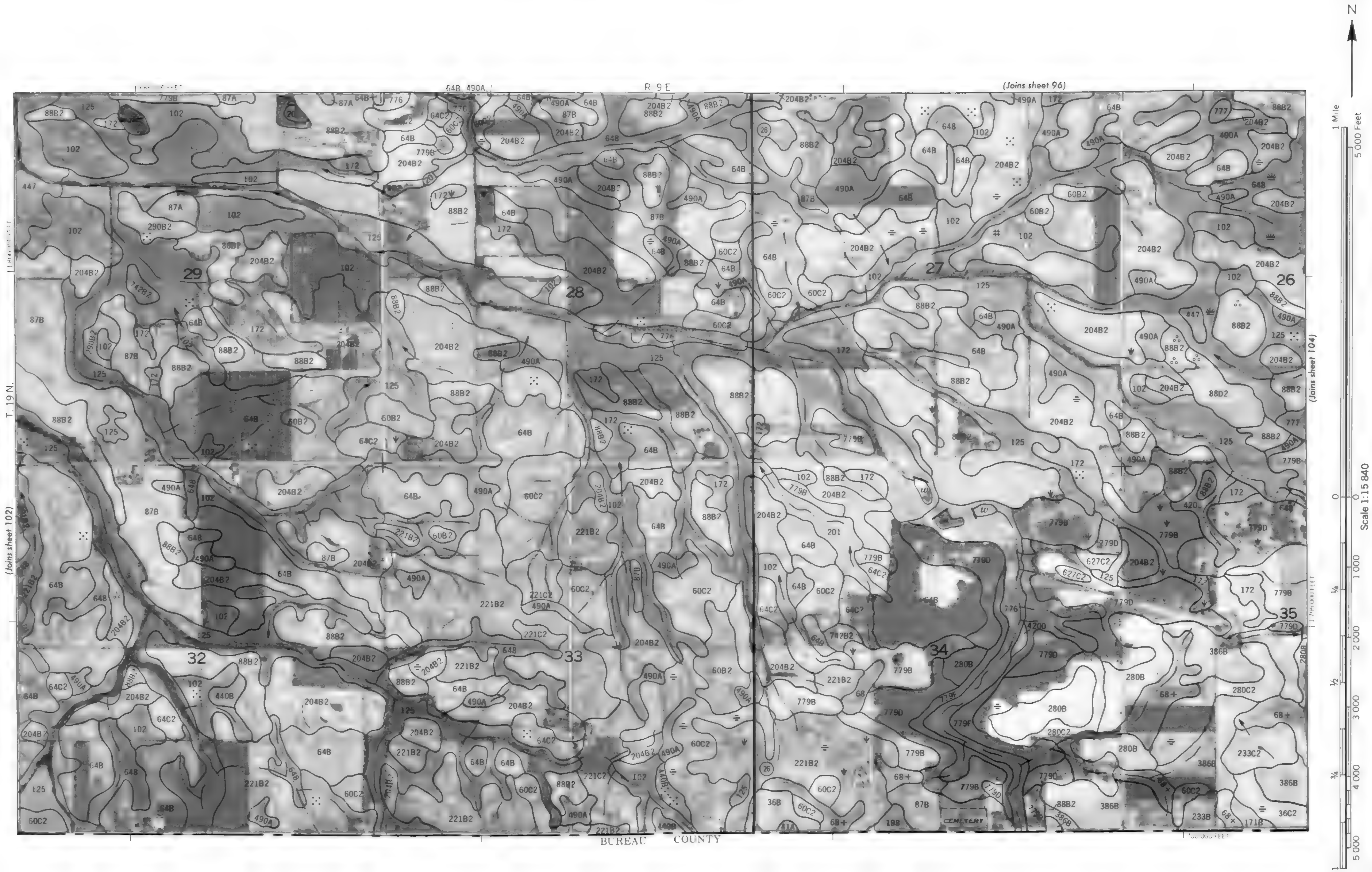
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

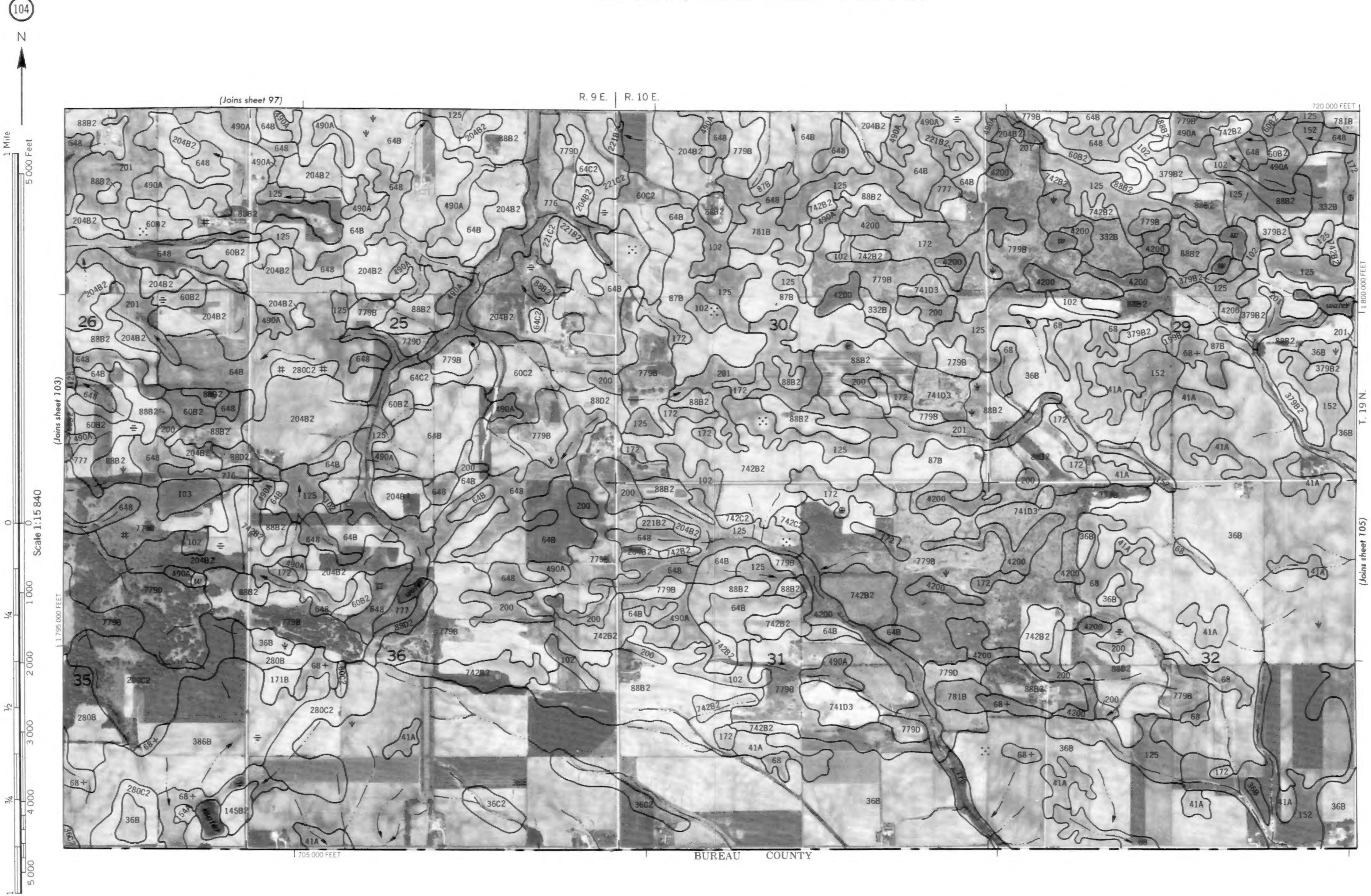
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

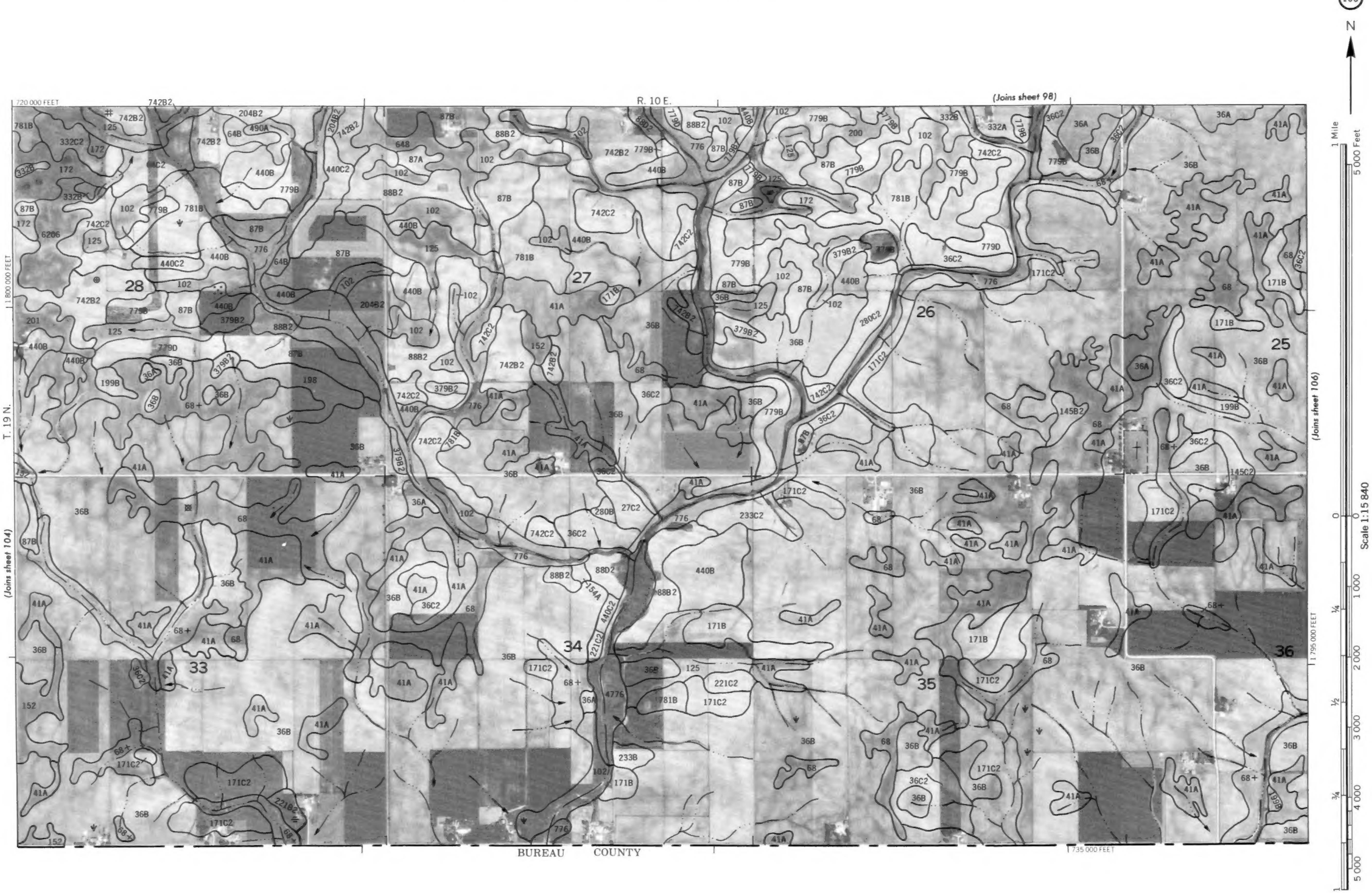


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

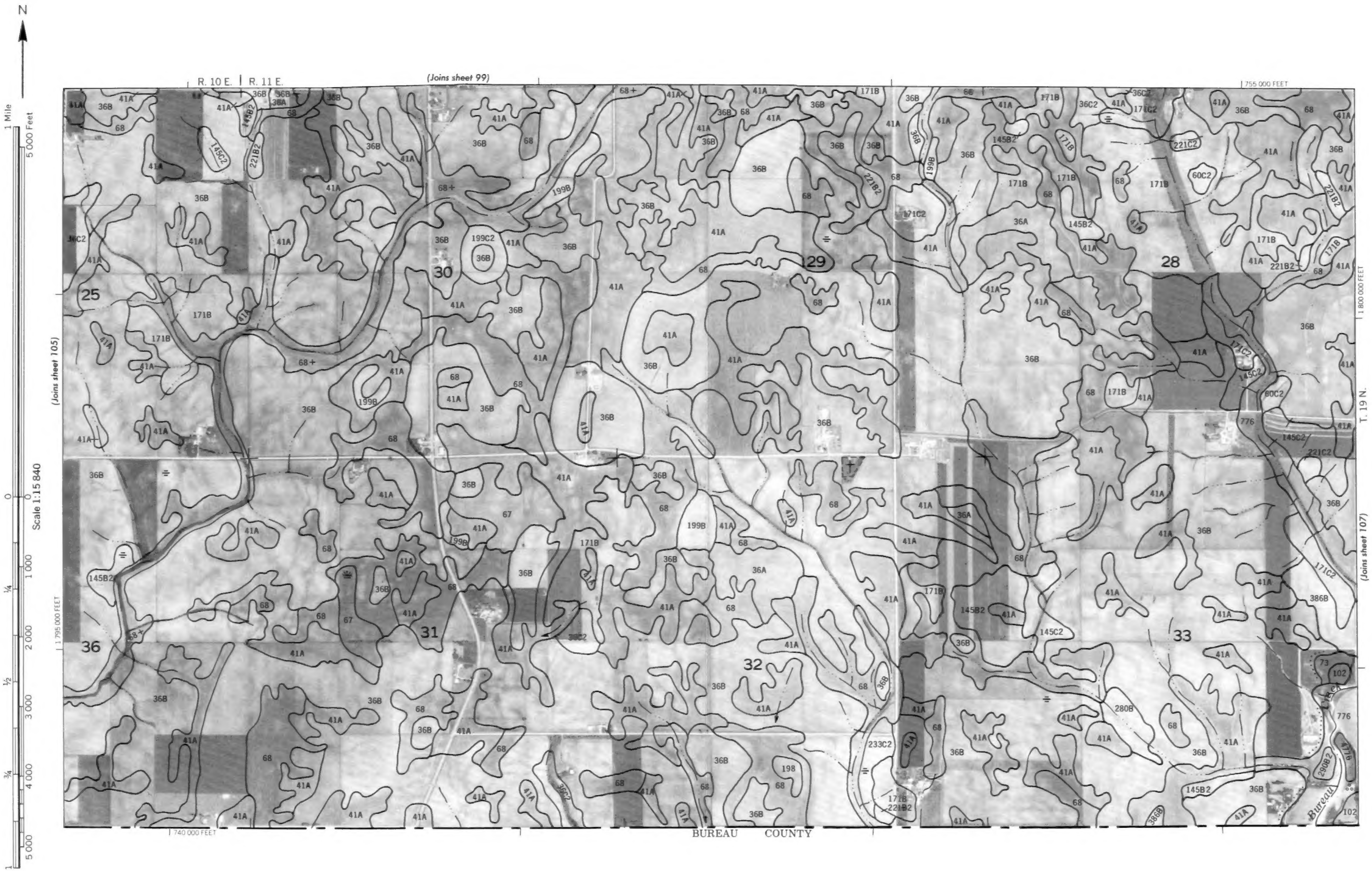

N
(Joins sheet 96)
R 9 E
T. 19 N.
(Joins sheet 102)
(Joins sheet 104)
29
28
27
26
32
33
34
35
CEMETERY
BUREAU COUNTY
1 Mile
5 000 Feet
Scale 1:15 840


104
N
(Joins sheet 97)
R. 9 E.
R. 10 E.
720 000 FEET
1 800 000 FEET
T. 19 N.
(Joins sheet 103)
(Joins sheet 105)
1 795 000 FEET
705 000 FEET
BUREAU COUNTY
Scale 1:15 840
1 Mile
5 000 Feet
26
25
30
29
35
36
31
32

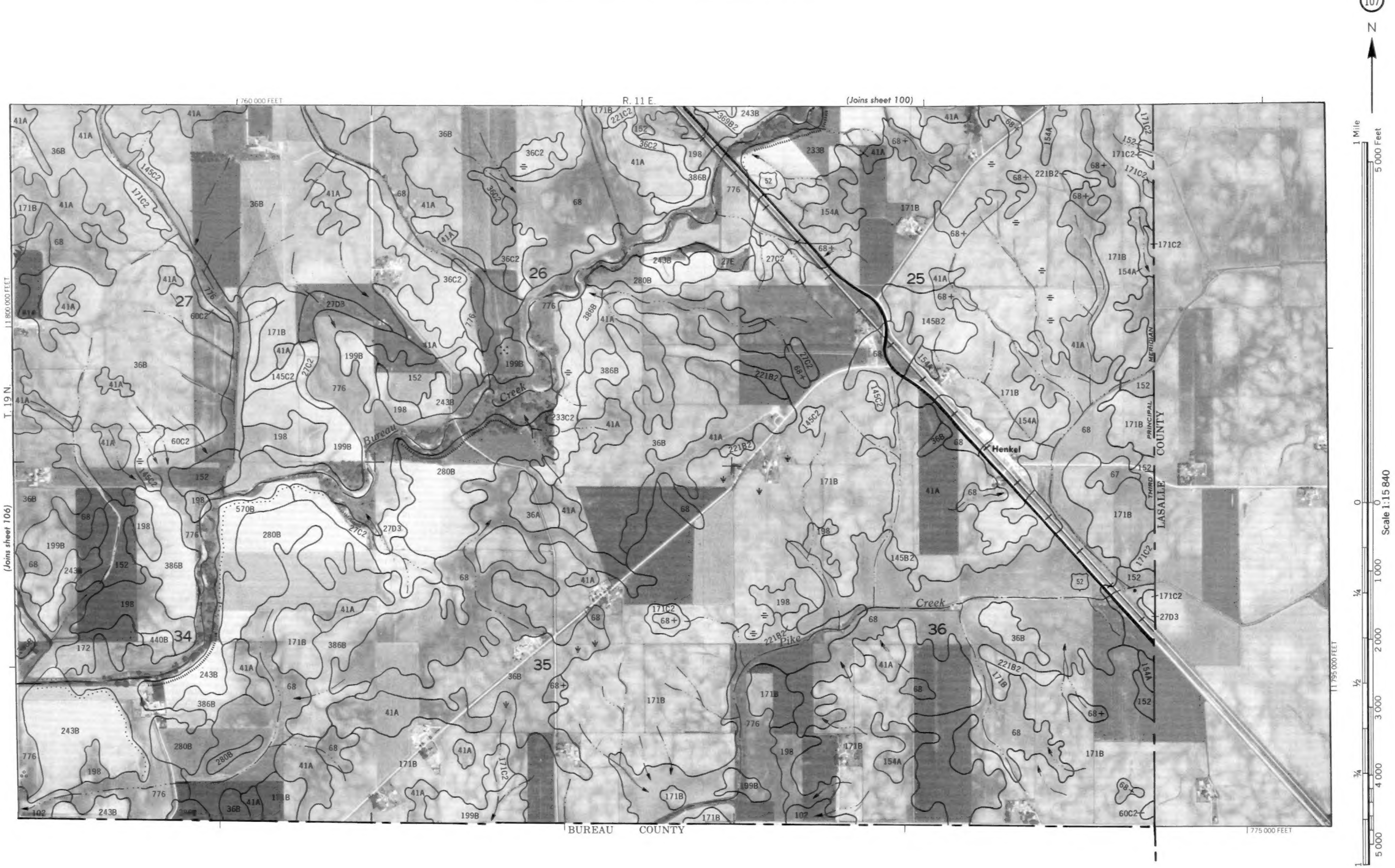


*This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

LEE COUNTY, ILLINOIS — SHEET NUMBER 106



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.